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THE BONE LESIONS ACCOMPANYING CERVICAL SPINAL-CORD INJURIES*

An End-Result Study of 76 Cases

DONALD MUNRO, M.D.,† AND WALTER WEGNER, M.D.‡
BOSTON

A CASUAL review of the literature on "broken necks" emphasizes the confusion that exists as to the therapy and ultimate prognosis of this traditionally dangerous injury. As one's experience increases, one's pessimism grows less, however, and at the same time systematic segregation of the various elements involved becomes more and more imperative.

The therapy and prognosis of injuries of the cervical spine that do not involve the cord are quite different from those in cases in which cord injury plays a part. Such a study as that by Roberts[1] loses much of its potential usefulness because of his failure to take this into consideration. It is also essential, in our opinion, to differentiate the true acute cord injury which occurs at the time of the accident and the chronic lesion in which the damage to the cord takes place later. The latter may be a proper subject for fusion, as advocated by Cone and Turner.[2] Nevertheless, success with these late cases does not, as these authors imply, justify the use of the same therapeutic procedure in acute cases, even though the original bone injury may have been the same. Furthermore, it is futile to use for cervical-spine and cervical-cord injuries the methods of treatment that may be applied properly to analogous thoracic or lumbar lesions.[3, 4] Finally, adequate length of follow-up must be included as an essential part of the evaluation of the efficiency of any therapy. For these reasons we propose to discuss only cervical injuries, only those that are truly acute, only those in which there has been both bone and spinal-cord damage, and only the diagnostic, therapeutic and prognostic aspects of the bone lesion.

Our series is made up of 76 cases. In 34 of them the patients died in the hospital in twenty-four hours to two years after admission, a mortality of 45 per cent. Thirty-eight patients were discharged from the hospital with varying degrees of recovery, and 4 are still under treatment.

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†Assistant professor of neurological surgery, Harvard Medical School; chief surgeon for neurosurgery, Boston City Hospital.

‡Assistant in neurological surgery, Harvard Medical School; associate surgeon for neurosurgery, Boston City Hospital.

GENERAL CONSIDERATIONS

As our experience has increased, certain fundamentals have forced themselves upon our consciousness. None of them are new, and all have been mentioned by previous authors. Despite this, however, we are convinced that their importance is not generally recognized and that further discussion of them will be profitable.

The commonest and perhaps the least understood of these principles have to do with the mechanism of cervical dislocations. They are most apt to occur between the first and second and between the fourth, fifth and sixth vertebrae. The atlanto-axial dislocations occur because the articular facets of the axis and atlas are horizontal, or nearly so, and therefore the maintenance of the position of one of these vertebrae on the other depends only on the integrity of the ligaments and odontoid process. Although the articular facets are more nearly vertical in the inferior part of the cervical spine, the usual site for dislocations is between the lower vertebrae.

Nearly all cervical-spine injuries occur as the result of indirect violence which causes excessive flexion. The flexion occurs partly as the result of a protective reflex and partly because of the structure of the spine. The latter consists essentially of two parallel columns, one in front of the other. The anterior column is made up of the vertebral bodies and the intervertebral disks, and the posterior column of the neural arches. These include the pedicles, articular pillars, laminae and spinous processes. The anterior column is compressible, because of the elasticity of the intervertebral disks, but the posterior column is rela-

tively rigid. Linear stress applied indirectly to the spine through a blow on top of the head causes compression of the anterior column, while the posterior column maintains its length but bends forward to accommodate itself to the shorter anterior column. As flexion increases, the linear force develops a forward component which produces a shearing stress on the articular facets (Fig. 1). This shearing tends to produce dislocation, which is impeded by the oblique position of the facets and by the restraining ligaments and other fibrous structures, of which the intervertebral disks and the ligamentum flavum are the most important. The joint between the articular facets is enclosed in a loose capsule and has been described as arthrodial,[6] which means that it has a gliding motion. If this were its only possible motion, however, an attempt at flexion would produce the result shown in Figure 2, in which the bodies of the vertebrae are widely separated. We know from x-ray evidence that this does not occur when the uninjured neck is flexed, but rather that the anterior edges of the vertebral bodies come closer together (Fig. 3). Such a motion is possible only if an additional tilting movement of the upper articular facet is exerted on the one below. Such tilting, if carried to excess, makes it easy for the upper facet to override the lower, thus producing a dislocation without associated bone injury (Fig. 4). Tearing of the intervertebral disk and the ligamentum flavum, however,

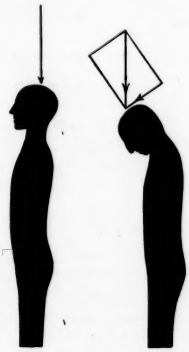

FIGURE 1.

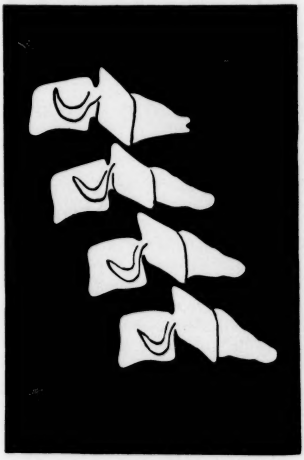

FIGURE 2.

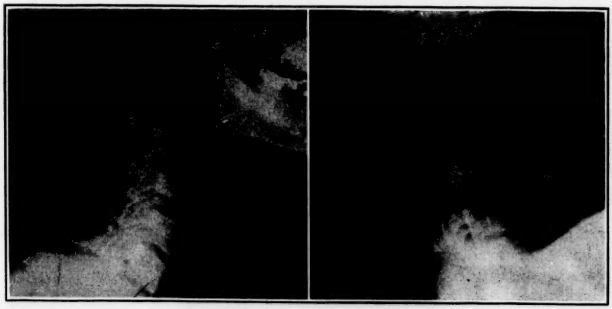

FIGURE 3.

is apt to result. The stability of the neck following this type of injury is not augmented by such formation of callus as occurs when there has been extensive bone damage, and the dislocation is apt to recur if not fused. Regardless of type, we have

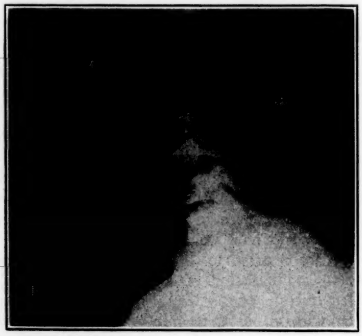

FIGURE 4.

had only 7 cases of dislocation without associated fracture in the present series.

Any significant dislocation, and particularly the total variety of dislocation, results in angulation of the vertebral canal (Fig. 5). This, in turn, may cause pressure upon the cord at that point. It is nevertheless undoubtedly true that immediate partial to complete recoil of the partial dislocations may occur following the production of a degree of cord injury that is inconsistent with the x-ray findings at the time the patient is first seen.

Posterior dislocation of the cervical vertebrae is so rare as to be of no practical significance. It occurred only once in our series and was between the axis and the atlas. It followed a horizontal blow on the forehead and was accompanied by a fracture of the odontoid process.

DIAGNOSIS

The diagnosis of the bone injury (Table 1) has been made by x-ray for the most part, being occasionally supplemented by laminectomy and autopsy. Satisfactory visualization of the bone injury by x-ray is difficult and often impossible. Attempts to take films should never be made unless the surgeon is present to see that flexion of the neck is avoided. Films should include lateral and anteroposterior views and a view through the open mouth. Cone and Turner[2] have suggested that the base of the skull also be visualized. Traction on the shoulders may be required to show the sixth and seventh cervical vertebrae, and the roentgenologist should be given every assistance in his effort to obtain these difficult views. It is doubtless often impossible to show fractures of the articular facets, even though oblique views are taken. We were able to visualize such a fracture only twice in this series.

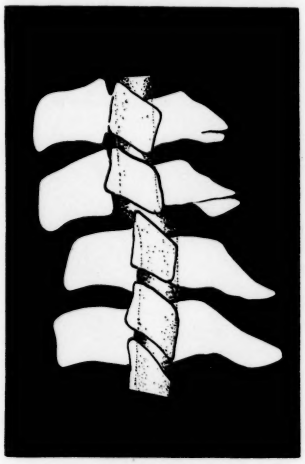

FIGURE 5.

TREATMENT

Treatment of the bone injury in this particular group of cases must be conditioned by the thera-

TABLE 1. *Diagnosis of Bone Injury.*

DIAGNOSIS	OUTCOME OF CASE	CERVICAL VERTEBRA INVOLVED								X-RAYS NEGATIVE	NO X-RAYS	TOTAL
		1	2	3	4	5	6	7	Multiple			
Dislocation only	Living	0	0	1	0	1	1	0	1	0	0	4
	Dead	0	0	0	1	1	1	0	0	0	0	3
Dislocation and fracture	Living	2	0	0	0	2	2	1	3	0	0	10
	Dead	0	0	0	1	5	2	0	7	0	0	15
Fracture only	Living	0	0	2	1	7	3	1	8	0	0	22
	Dead	0	0	1	1	2	2	0	3	0	0	9
No diagnosis	Living	0	0	0	0	0	0	0	0	4	2	6
	Dead	0	0	0	0	0	0	0	0	0	7	7
Totals		2	0	4	4	18	11	2	22	4	9	76

peutic needs of the damaged cord and the presence or absence of a spinal subarachnoid block. Since nearly all the injuries occurred in association with flexion, traction in hyperextension was usually provided at the start. The simplest, and we think the best, way of applying traction where only a moderate pull is needed is by a halter made of three-inch flannel bandage, as shown in Figure 6. This is led over a pulley at the head of

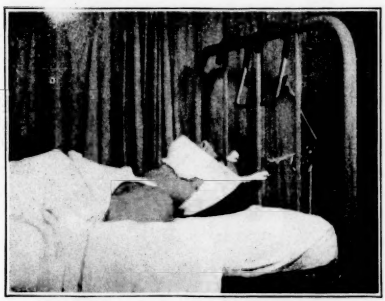

FIGURE 6.

the bed and attached to a 5-pound weight. Flannel bandage is more comfortable and less apt to cause pressure sores around the chin and occiput than is the common leather halter. The chin is padded with lamb's wool, which does not become lumpy like cotton. The amount of traction that can be applied by this method is limited by the ability of the skin and the mandible to withstand pressure. Attempts to use more than a 5-pound weight have resulted in pressure sores of the chin and occiput, and in 1 case led to osteomyelitis of the mandible. Where greater amounts of pull were felt to be necessary, we have used Cone and Turner's[5] method (Fig. 7). Traction is applied by a loop of rustless steel wire passed through two adjacent burr holes in the skull on either side of the midsagittal plane. A variation in the anteroposterior position of the burr holes alters the degree of hyperextension. Twenty-five or 30 pounds (in 1 case we used 60 pounds for twelve hours) can be suspended from such an arrangement for long periods of time, and with no discomfort to the patient. If necessary, a patient can even be set up in bed and the traction still be kept in place—a feature that is particularly useful for elderly people. Its disadvantages lie in the procedure necessary to apply it and in the occasional breaking of the wire or of the bone bridge between the trephine holes (each occurred in 1 case). Because of the handling necessary to apply it, this type of traction was not used on acutely ill patients, and ordinarily not until after the first three days following injury. We have employed it in 7 cases.

Even with great weights, however, the method will not necessarily reduce a dislocation in which the facets are locked. This is particularly true if the direction of pull is in hyperextension. As Walton[6] and subsequently Taylor[7] pointed out, it is often well to begin traction in slight flexion, and to change to extension only after the facets have been so far separated as to permit the upper to slide backward into its proper position. This is especially true in complete dislocations, when the upper articular facets have become locked in front of the lower. We believe that it is safe to use Cone and Turner's method of reducing cervical dislocations even in the presence of associated fractures, and have done so.

We are opposed to the reduction of a dislocation by manipulation whenever there is an associated fracture of the laminae, pedicles or facets. Even with an ideal technic, such manipulations may cause unknown and uncontrolled shifts in the position of the fragments, with possible permanent damage to the cord. We have had occasion to use manipulation in 2 cases. One of th patients died a few hours afterward, and in the

FIGURE 7.

other case the diagnosis was questionable. There was also 1 patient whose dislocation had been manipulated but not reduced before reaching us. He had no cord symptoms before the manipulation, but afterward there was quadriplegia with a complete block.

Even in the presence of a subarachnoid block and regardless of the bone damage, we no longer operate on cervical-cord injuries in the first few days after the accident. Although this change in policy happened to coincide with the introduction of tidal drainage[8] and other improved methods of

handling these cases, it was probably the most important factor in reducing our mortality by 30 per cent (Table 2). However, if the subarachnoid block persists despite adequate traction, and with or without reduction of the deformity, the cord is decompressed. In this connection it is worth while to note that we had 1 patient with a persistent spastic quadriplegia whose cord was not decompressed until ten days after the injury. A postoperative block developed, with subsequent symptoms suggestive of thrombotic transverse myelitis. This is in line with recent work on the circulation of the cord by Suh and Alexander[9] and Herren and Alexander.[10] The cord in the case noted appeared to be entirely normal and was not touched at operation. We believe that this may well represent the effect of allowing a block to go unrelieved for too long a period.

TABLE 2. *Influence of Laminectomy on Mortality Rate.*

Classification of Cases	1930–1934			1934–October, 1939		
	No. of cases	Cases operated on	Mortality	No. of cases	Cases operated on	Mortality
		%	%		%	%
Total cases	30			46		
Cases operated on	13	43		7	15	
Deaths within 72 hours	13			7		
Total deaths	19		63	15		33

All our patients have been kept in traction for at least six weeks, and usually eight or nine. At the end of that time they are fitted with a leather cuirass having a high occiput but no forehead strap,[1] or else, if there is x-ray evidence of sufficient bone repair and union to warrant it, a leather Thomas collar. Usually the patients have been allowed to remove the splint for the night after another six weeks or two months. However, they have been made to wear it when upright and during the day, until such time as there is x-ray evidence of solid bone union or repair at the site of the original fracture. They have been given no special exercises. We are opposed to the use of plaster-of-Paris jackets on account of their weight and discomfort, and the increased incidence of bed sores. We have never used one in an acute cervical-cord injury, and the removal of several applied in other clinics has resulted in immediate improvement in the patients' condition. Moreover, 1 patient in this series came to us for treatment of a contusion of the cord with quadriplegia that had occurred during the application of a plaster cast. We believe that its use in cervical spine and cervical-cord injuries is dangerous and ordinarily contraindicated.

None of our cases have been fused. Excluding 5 patients who have been followed for less than six months, 2 who have been lost and 5 who are still in the hospital, we have 30 such patients who have been followed for one to fifteen years. Of these, 2 developed a recurrent late dislocation. In 1 case the dislocation was put back into correct position by skeletal traction, and there is reason to suppose that it will stay there. The other patient refused further treatment. Neither had any secondary cord symptoms. Contrary to Cone and Turner's[2] opinion, our experience has been that while, as they say, reduction is simple in the complex fracture-dislocations, under properly prolonged traction and splinting they are the least apt to slip and therefore the least in need of fusion. On the contrary, — and it was this condition that was present in our 2 cases in which slipping occurred, — dislocations without fracture are apt not to unite until late, because healing depends solely on ligamentous repair. They are prone to redislocate, and are therefore the cases *par excellence* for fusion.

Our experience with occipitoatlantoaxial and odontoid dislocations and injuries has been too small to justify any conclusions. Of our 2 patients — both with broken odontoid processes — one had an anterior and the other a posterior dislocation of the occiput and atlas on the axis. The anterior dislocation occurred in a chronically recurrent case with compression of the cord that eventually, after decompression, stabilized itself along the anterior aspect of the spinal column without any other fusion. The case with posterior dislocation is still on traction in the hospital.

All cord injuries regardless of the bone injury are placed on tidal drainage[8] immediately after the patients' arrival on the ward. With the proper adjustment of the apparatus to the type of bladder it is serving, we have found it possible to do without air, water, cork or other special mattresses. We believe Bradford frames to be distinctly harmful and unnecessary in the care of these cases. The patients can be turned more safely and come to less damage if kept on an ordinary mattress with the bed made up in the usual way and the drawsheet used to rotate them.

Discussion

Age Distribution

The efficacy of any treatment that requires immobilization of the patient for six weeks or more may be materially affected by the age distribution of the group under consideration (Table 3). In this group of bone injuries associated with cervical-cord injuries, the effect of age on the efficacy of treatment was minimal, and we do not believe

that age need be considered a significant factor if treatment is carried out as outlined.

Spinal-Cord Injury

Obviously the outcome of the bone injury, in terms of usefulness, will depend on the extent of the damage to the nervous system. Table 4 is self-explanatory, and merely demonstrates that the more serious the cord injury, the less chance the patient has to survive.

TABLE 3. *Age Distribution in Relation to Fatal Outcome.*

DECADE	LIVING	DEAD	TOTAL
1–10	2	0	2
11–20	4	4	8
21–30	10	4	14
31–40	4	6	10
41–50	8	6	14
51–60	8	4	12
61–70	5	6	11
71–80	1	2	3
81–90	0	1	1
Unknown	0	1	1
	yr.	*yr.*	
Youngest	9	14	
Oldest	75	84	
Average	41	46	

Cause of Death

We are uncertain as to the cause of death in cervical-spine and spinal-cord injuries. However, except in the case following manual reduction of the dislocation, we can say that the bone lesion is not a factor. The causes listed in Table 5 are symptomatic rather than etiologic.

TABLE 4. *Type of Cord Injury in Relation to Fatal Outcome.*

TYPE OF INJURY	LIVING	DEAD	TOTAL
Transection or crush	0	9	9
Compression	1	0	1
Contusion	5	16	21
Hematomyelia	30	9	39
Stab wound	1	0	1
Radiculitis	1	0	1
Cerebrospinal-fluid block	10*	19	29

*In 4 cases, block occurred without any other diagnosable cord injury.

End Results

As has been pointed out above, the end result of the bone injury itself has been fusion of a varying degree and with an approximation to normality except in 2 cases (Table 6). Crippling arthritis of the arms and hands, and less so of the legs, has prevented the attainment of the potentialities for recovery that have rested in the older patients. This has necessitated classification of some cases as having had an unsatisfactory end result. Those classed as satisfactory have been considered to be so by the patients themselves. They are able to care for themselves and get about freely, but not to earn a living. Those classed as well can earn their living in addition.

SUMMARY AND CONCLUSIONS

The therapy and prognosis of cervical-spine injuries which do not involve the spinal cord or are already chronic when first seen are quite different from those in which the cord injury plays a part and in which the patient comes for treatment immediately following the receipt of his injury.

Treatment of the bone injury in combined cervical-spine and spinal-cord injuries is conditioned by the therapeutic needs of the damaged cord and the presence or absence of a spinal subarachnoid block.

Although undoubtedly influenced by the introduction and use of tidal drainage and certain other procedures, our mortality in cervical-cord injuries has dropped over 30 per cent since we have abandoned immediate laminectomy as a therapeutic measure.

In a series of 76 cases, 30 of which have been

TABLE 5. *Presenting Symptoms at Time of Death in Fatal Cases.*

LENGTH OF LIFE AFTER INJURY	PRESENTING SYMPTOM OR SYMPTOMS: RESPIRATORY	SURGICAL SHOCK	CIRCULATORY COLLAPSE	SECONDARY TO MANUAL REDUCTION	SEPSIS
da.					
1	9	2	0	0	0
2	5	0	0	1	0
3	3	0	0	0	0
4	2	0	1	0	0
5	2	0	1	0	0
6	2	0	0	0	0
7	1	0	0	0	0
10	1	0	0	0	0
Over 10	2*	0	0	0	2†

*18 days and 1 month, respectively.
†12 days and 2 years, respectively.

TABLE 6. *End Results in Recovered Cases.*

LENGTH OF FOLLOW-UP	END RESULTS: NOT SATISFACTORY	SATISFACTORY	WELL	DIED OF INTERCURRENT DISEASE	LEFT AGAINST ADVICE
In hospital	5	0	0	0	0
3 mo.	0	0	2	0	1
5 mo.	0	2	0	0	0
8 mo.	0	1	0	0	0
9 mo.	1	0	0	0	0
10 mo.	6	1	0	0	0
1–2 yr.	0	1	2	1*	0
2–3 yr.	1	3	0	0	0
3–4 yr.	0	4	1	1†	0
4–5 yr.	0	1	1	1‡	0
5–6 yr.	0	1	1	0	0
6–7 yr.	0	0	2	0	0
7–8 yr.	0	0	2	1§	0
12 yr.	0	0	1	0	0
15 yr.	0	0	1	0	0
? yr.	0	1	0	0	0
Not followed (lost)	2	0	0	0	0
Totals	9	15	13	4	1

*Arteriosclerosis, with psychosis.
†Cause unknown.
‡Heart disease.
§Cancer of rectum.

followed for one to fifteen years, there have been only two recurrences of the original bone injury and no late development of secondary cord symptoms.

Thirty-four patients (45 per cent) died before discharge and as the direct or remote result of the injury. Of this group 50 per cent died within the first forty-eight hours, 85 per cent within the first week and one each at ten, twelve and thirty days, and two years.

Of the 30 living patients whose cases have been adequately followed, 28 have had satisfactory end results; 4 have died of intercurrent disease.

818 Harrison Avenue.

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Discussion

Dr. Ezra A. Jones, Manchester, New Hampshire: Our records show that since 1930 we have had 18 cases of cervical-spine injury: 8 dislocations and 10 fractures. Dislocations were complicated in 2 cases by fracture of the odontoid process. One case was complicated by marked weakness in the shoulder and arm muscles. This weakness cleared up when traction was applied, and at the end of two months practically full power had returned. The position of the odontoid process remained unchanged. The other case was rather interesting from the fact that the displaced odontoid process was pushed back into position when the reduction of the first on the second cervical vertebra was effected by manipulation. The fourth cervical vertebra was dislocated three times, and the fifth once. The fourth was fractured once, the fifth three times, and the sixth twice. The odontoid process was fractured four times; there were no complications and very little displacement. There were nerve injuries in 11 cases. There were 3 deaths within a few hours of the accident. One patient had a dislocation of the second cervical vertebra with a fracture of the odontoid process, and two had fractures of the sixth vertebra.

Tidal drainage was necessary in only 1 case. This patient had a complete muscular paralysis from a fracture of the sixth cervical vertebra, and the fracture was reduced within a half hour after the accident. Power began to return within two hours after the reduction and improved for about six months, so that the patient was able to walk without the aid of braces; but after two years there was marked residual paralysis of both arms and both legs. Tidal drainage was used for about eight months.

In the other cases the nerve involvement was not severe and there was no marked permanent paralysis. In most of these cases, traction was maintained by small tongs attached to the mastoid processes. This has been much more comfortable for the patients than either the Crile halter or a leather halter.

ACUTE ABDOMINAL CONDITIONS FOLLOWING OVULATION AND ITS SEQUELAE*

DANIEL J. MCSWEENEY, M.D.† AND FRANK O. WOOD, M.D.‡

BOSTON

RUPTURED graafian follicle, bleeding corpus luteum, ruptured corpus hemorrhagicum and corpus hemorrhagicum cyst with or without rupture are conditions frequently overlooked in the differential diagnosis of acute lower-abdominal pain in women.

Cases of the severe type with profuse hemorrhage from the ovary were reviewed by Novak[1] in 1917, Moore[2] in 1922, Phaneuf[3] in 1924 and Johnson[4] in 1930. The milder cases, however, were not given sufficient attention until Allen, Pratt, Newell and Bland[5] in 1928 definitely fixed the time of ovulation as occurring about midway between periods. Thereupon Pratt[6] in 1934 wrote an excellent treatise on the subject, giving in detail 10 cases. Hoyt and Meigs[7] in 1936 reported 58 cases of which 17 were diagnosed correctly before operation, while Wharton and Hendriksen[8] in the latter part of 1936 reported 61 cases. The recent work of Miller,[9] which presents persuasive evidence that the time between ovulation and the next menstruation is fourteen days regardless of the rhythm in the cycle, should stimulate more study of the possible subjective and objective symptoms associated with ovulation, and should aid also in more accurately diagnosing pain as due to this latter phenomenon.

Ovulation may cause pain in several ways. First, pain may be caused by rupture of the graafian follicle with the escape of follicular fluid or at times a few drops of blood from the follicle when the ovum is extruded — the so-called *Mittelschmerz* of the Germans. After the ovum has been expelled there may be pain as blood escapes through failure of the stigma to become sealed off as the corpus hemorrhagicum is forming. Later in the cycle there may be pain due to rupture of the corpus hemorrhagicum or to the formation of a corpus hemorrhagicum cyst, which may cause pain of itself or by rupture.

Novak[10] in 1917 stated that no organ in the body was so frequently the seat of hemorrhage as the ovary. In a study of 85 cases, in which one or both ovaries were removed at operation, he found that most of the hematomas in the ovaries were due to hemorrhages into the follicular apparatus, especially the corpus luteum. His study showed that as the follicle matured it received its blood supply from the vessels of the theca interna by way of tiny offshoots which penetrated the granulosa. Discharge of the ovum occurred with little or no bleeding into the abdominal cavity or into the lumen of the follicle. After the expulsion of the ovum there followed a stage of hyperemia marked by a great increase in the size and number of the vessels in the theca and the base of the granulosa. Thereupon there was bleeding into the follicle with the formation of the corpus hemorrhagicum, the hemorrhage being moderate in amount and mostly uniform in character, and the escaped blood forming a narrow zone adhering to the inner layer of the lutein zone. In certain cases the hemorrhage may overshoot the mark and cause bleeding into the peritoneal cavity or form a corpus hemorrhagicum cyst, which in turn may rupture and cause hemorrhage. Johnson[4] claimed that in some graafian follicles which are not entirely ripe there may be hemorrhage due to some sudden hyperemia of the pelvic organs. This might result in premature separation of the ovum within the follicle, with possibly a bursting of the follicle at its weakest point and continued hemorrhage into the peritoneal cavity. The latter theory would account for the cases of bleeding seen in the early part of the cycle, particularly when trauma is a prominent factor.

A study of the records at the Boston City Hospital showed that from 1926 through 1938 257 patients were admitted to the main hospital with a chief complaint of abdominal pain due to ovulation or its sequelae. Of these, 216 were operated on and 41 were diagnosed as ruptured graafian follicles or ruptured corpora hemorrhagica and not treated surgically. Among the operated cases there were 20, including 5 of corpus hemorrhagicum cyst, 1 of which had ruptured, diagnosed correctly before operation, and 38 in which the sequelae of ovulation were considered strong possibilities in differential diagnosis but with symptoms severe enough to warrant operation. Assuming the diagnosis to be correct in the 41 unoperated cases, there were 61 correct diagnoses, which we consider to be an admirable record for a condition which simulates so closely appendicitis and many pelvic disorders, and of which in 1930 Johnson,[4] after an exhaustive survey of the

*From the Department of Gynecology, Harvard Medical School and the Gynecological and Obstetrical Service, Boston City Hospital.

†Assistant in gynecology and obstetrics, Harvard Medical School; junior visiting surgeon in gynecology and obstetrics, Boston City Hospital.

‡Visiting surgeon in obstetrics and gynecology, Hartford General Hospital, Hartford, Connecticut; formerly, resident surgeon in gynecology and obstetrics, Boston City Hospital.

literature, found not a single case of correct diagnosis.

Since pain from ovulation and its concomitant phenomena is most frequently mistaken for appendicitis, we studied the relative incidence of the two conditions during two typical years at the hospital. In both 1935 and 1936 there were 39 cases of acute abdominal pain considered due exclusively to ovulation or to a ruptured corpus hemorrhagicum. In 1935 there were 556 cases and the following year 504 cases of appendicitis of all degrees occurring in women between the ages of thirteen and forty-five, the age period when symptoms from ovulation occur. Thus in the latter class of hospital admissions there was an incidence of 1 case with pain from ovulation to every 13 of appendicitis.

In order to determine how frequently ovulation might cause discomfort in the abdomen, not severe enough to demand medical aid, we questioned for a month all gynecological patients who had normal menstrual regularity and found that 21 out of 134 patients, or about 1 in 6, frequently had abdominal pain of a minor degree midway between periods when ovulation would ordinarily occur. During this study we found that 53 of 134 patients (40 per cent) had some symptoms suggesting ovulation, such as spotting, soreness of the breasts, leukorrhea or abdominal pain.

Our series, from 1926 through 1938, may be differentiated into three categories. First, there were 74 cases, including 15 which were discharged without operation, which could be considered as those of ruptured graafian follicles. The 59 operated cases in this group were characterized by an absence of free blood in the peritoneal cavity but by evidence of recent ovulation in the form of a distinct unruptured corpus hemorrhagicum. In this group nothing was done surgically to the ovaries. The unoperated cases showed mild symptoms which cleared up a few hours after entry.

Second, there were 165 cases of ruptured corpus hemorrhagicum, of which 139 were operated on. The operated cases showed evidence of free blood in the pelvis ranging from 1 to 120 cc. of serosanguineous fluid. The majority of these cases showed a small amount of blood and a ruptured corpus hemorrhagicum about 1 or 2 cm. in diameter. Of this latter group 39 patients were still oozing blood at the time of operation. All the corpus hemorrhagicum cases were treated by mattress suture.

In the third category there were 18 cases of corpus hemorrhagicum cyst, of which 13 had ruptured. Resection was done in all the cases of this group, and the pathological diagnosis was corpus hemorrhagicum cyst or corpus luteum cyst with hemorrhage. Since we have not included any cases with obvious signs of intra-abdominal hemorrhage, so well described by other authors,[1-4] the cases in all three categories presented similar general symptomatology differing only in minor details.

The variable degree of discomfort caused by these conditions is shown by the fact that 30 per cent of the patients came to the hospital on the first day of their attack, 67 per cent within three days and the remaining 3 per cent anywhere from the fourth to the twenty-first day after the pain had started.

The difficulty in the management of many of these cases is well demonstrated by the fact that, of the 216 patients who were operated on, 58 were observed from three to nine days before operation was performed; the other 158 were considered sick enough to justify operation on the day of entry or the next day. Those who were not operated on were kept in the hospital for two to four days before discharge.

The ages varied from ten to forty-five years, with 73 per cent of the cases occurring between fifteen and twenty-five. Single women comprised the larger part of the latter group. Many of the unoperated cases, however, would tempt one to venture the opinion that single women had a lower threshold for pain than married women, the latter being more liable to carry on through the discomfort without being hospitalized.

The time of onset in relation to the last menstrual period was determined in 162 cases. The pain started between the eighth and the twenty-first day after the beginning of the last period. One hundred and thirteen, or 70 per cent, of these cases occurred between the twelfth and the sixteenth day after the onset of the last menses. The patients with ruptured graafian follicles invariably had their symptoms at the middle or in the early part of the intermenstrual interval. Many of the cases of ruptured corpus hemorrhagicum started at the middle of the cycle, but the majority occurred in the latter part. All the patients with corpus hemorrhagicum cysts had their symptoms about twenty-one days after the first day of the last period.

The pain was sharp and knifelike, at times radiating to the umbilicus but more often diffuse across the whole lower abdomen. In 12 cases there was pain in the back, and in 5 the pain radiated to the right knee. In the latter group more blood was usually found in the pelvis than is ordinarily encountered. The pain was distinctly intermittent, except in the cases with cysts, and tended after its acute onset to localize in the right lower quadrant of the abdomen even if the left ovary was involved. In our series there were 32 cases in which the left ovary was involved, and

25 of these had right-sided pain. The pain seemed to subside considerably or completely in the recumbent position and was distinctly aggravated by exercise.

Trauma, such as that caused by walking, running, bending, coitus and getting out of bed, was elicited in 18 cases as a precipitating cause. This number would probably have been considerably larger had the patients been questioned more carefully regarding the relation of their attacks to some form of trauma, especially that of mild degree, which imperceptibly increases intra-abdominal pressure.

Our study would suggest that the cases with ruptured follicles had an acute onset, the acute stage lasting but a few hours, whereupon there followed a period, variable in length but usually brief, of discomfort in the lower abdomen. The cases of ruptured corpus hemorrhagicum after their acute onset were characterized by periodic alleviation of the pain, with acute exacerbations when the individual resumed activity. The symptoms in these cases tended to be intermittent but lasted a long time. The cases with more profuse bleeding were naturally severe, with the pain continuous rather than intermittent, and more closely simulated an acute abdominal emergency. The cases of corpus hemorrhagicum cyst seemed more gradual in onset, except in ruptured cases, and the pain was invariably steady without interruption. The cases of ruptured cyst were the most fulminating of all.

As regards gastrointestinal symptoms, vomiting was relatively infrequent, occurring in 73 cases, and was usually found only in the more fulminating cases. It came early in the attack and was never particularly distressing. Nausea was more frequently complained of and occurred in 155 cases. Anorexia was practically always a feature. The bowels as a rule were not affected. There were 12 cases of mild diarrhea occurring six to forty-eight hours after the onset of the attack, suggesting peritoneal irritation in the posterior cul-de-sac. Nothing very distinctive could be deduced from these data, but the vomiting had a tendency to be considerably less severe than that seen in the acute obstructive types of appendicitis, as suggested by Pratt[6]; on the other hand, it seemed to occur sooner after the pain than it did in the acute cases of appendicitis.

A history of previous attacks was elicited in 98 cases. In the ruptured follicle group, 39 patients (52 per cent) had had previous attacks, 31 having had several and 8 only one. In the ruptured corpus hemorrhagicum group, 52 patients (31 per cent) gave a history of previous similar trouble, 37 having had several attacks and 15 one. In the cyst group, 7 patients (38 per cent) had had a similar previous disturbance, 4 having had several attacks and 3 one; the other attacks invariably occurred in the late part of the interval between periods. There were only 8 cases with a history of pain occurring at regular monthly or bimonthly intervals, 6 of these being among the ruptured follicle cases which were not operated on.

Since the majority of such cases are confused with appendicitis, we were interested to see how many patients had had a previous appendectomy. In the entire series of 257 cases, only 6 patients had had their appendices removed. Of these, 1 case with pain on the left side and 2 cases with pain on the right side were diagnosed as ruptured corpus hemorrhagicum and the patients were discharged without operation. The other 3 were operated on, 1 case with left-sided pain being diagnosed as an ovarian cyst, and the other 2 with pain on the right side as adhesions and ectopic pregnancy, respectively.

The number of white blood cells varied from 4000 to 30,000. One hundred and sixty-four patients (64 per cent) had a count of 10,000 or less; 77 (30 per cent) had a count from 10,000 to 15,000; the rest (6 per cent) had counts ranging from 15,000 to 23,000. The white-cell count had a distinct tendency to fall in a short period of time or to stay elevated if there was much old blood in the pelvis.

The temperature varied from normal to 103°F., in most cases being about 99.6°F. In 30 cases (12 per cent) it was between 100 and 101°F. In 23 cases (9 per cent) it reached 103°F. The presence of old blood seemed to keep the temperature elevated.

The pulse varied but slightly from normal, and did not seem to rise commensurately with the temperature. Rarely was it above 100 beats per minute except in the few cases of ruptured hemorrhagic cyst, in which all the symptoms were more fulminating in type. After the initial onset the pulse tended to drop or remain stationary, in contradistinction to the patient with acute appendicitis, who tends to have a constantly rising pulse.

There was tenderness on deep pressure throughout the whole lower abdomen, particularly in the right lower quadrant, even if the lesion was on the left. Tenderness below McBurney's point was of considerable aid in differential diagnosis. Muscle spasm was conspicuous by its absence, as was rebound tenderness.

Vaginal or rectal examination, when done, usually showed slight tenderness in the affected vault, with occasional fullness in either fornix or the posterior cul-de-sac, depending on the amount

of blood present. The tenderness was distinctly low in the pelvis in the region of the involved ovary. Eight cases were considered to have a mass in one of the vaults and were diagnosed as cysts of the ovary.

The diagnoses made in the ruptured graafian follicle cases were as follows:

Ruptured graafian follicle	15	(unoperated)
Acute appendicitis	17	
Subacute appendicitis	21	
Chronic appendicitis	16	
Pelvic inflammation	2	
Adhesions (postoperative)	1	
Twisted ovarian cyst	1	
Cyst of ovary	1	
Total	74	

In the ruptured corpus hemorrhagicum series the following diagnoses were made:

Ruptured corpus hemorrhagicum	41	(26 unoperated)
Acute appendicitis	55	
Subacute appendicitis	47	
Chronic appendicitis	12	
Ectopic pregnancy	3	
Pelvic inflammation	6	
Cyst of ovary	1	
Total	165	

The cyst cases were diagnosed as follows:

Ruptured corpus hemorrhagicum	1
Cyst of ovary	4
Acute appendicitis	10
Subacute appendicitis	2
No diagnosis (exploratory laparotomy)	1
Total	18

From the foregoing data it is shown that the great majority of the cases in each group were confused with appendicitis — the milder forms in the ruptured graafian follicle cases and the more acute forms in the ruptured corpus hemorrhagicum and ruptured corpus hemorrhagicum cyst cases.

Our study and the various articles written on acute abdominal symptoms following ovulation would seem to bring out certain features of distinct value in differential diagnosis. The important diagnostic points are:

History of previous similar attacks.

Onset of pain within two weeks of due date of the next period.

Pain precipitated by mild trauma.

Attack occurring in presence of other molimina suggestive of ovulation, such as painful breasts, spotting and leukorrhea.

White-cell count at first elevated, tending to drop rapidly to normal.

Tenderness 2 cm. or more below McBurney's point.

Tenderness low in the pelvis by rectal or vaginal palpation.

Omitting the cyst cases, both intact and ruptured, in which surgical intervention is invariably necessary, we have charted (Table 1) the records of the Boston City Hospital showing the progress in the management of cases of ruptured graafian follicle and ruptured corpus hemorrhagicum, especially since publication of the excellent papers by Hoyt and Meigs[7] and Wharton and Hendriksen[8] in 1936. This chart demonstrates certain interesting facts. The ruptured graafian follicle cases have been reduced to zero, presumably because these were recognized by the admitting surgeons and treated as outpatient cases. The increase in the average number of days the patients were observed before operation shows the more conservative handling of these cases.

The incidence of correct diagnoses increased, with a resulting decrease in surgical intervention. There still remained many cases in which surgical intervention seemed necessary even though the diagnosis of ruptured corpus hemorrhagicum was made. In the latter group there was invariably found a corpus hemorrhagicum still oozing blood

TABLE 1. *Data Showing Advance in the Management of Cases.*

DATA	1926–31	1931	1932	1933	1934	1935	1936	1937	1938	TOTALS
Not diagnosed preoperatively										
Graafian follicle	4	10	21	9	8	4	2	1	0	59
Corpus hemorrhagicum	4	6	15	5	6	20	13	7	10	86
Diagnosed but not operated on										
Graafian follicle	0	1	1	1	1	6	4	1	0	15
Corpus hemorrhagicum	0	1	2	1	1	1	4	5	11	26
Diagnosed but operated on	0	0	2	1	1	3	3	2	3	15
Diagnosis considered but patient operated on	3	2	2	1	0	5	13	5	7	38
Totals	11	20	43	18	17	39	39	21	31	239
Incidence of correct diagnoses (per cent)	0	10	11	16	16	25	28	38	45	
Average days of observation before operation	1.3	1.5	1.5	1.6	1.5	3	2	3	3	
Incidence of surgical intervention (per cent)	100	90	95	88	88	82	79	71	66	

at the time of operation. Although the percentage of correct diagnoses is increasing and is as high as that observed in other clinics, we believe that our results will be even better as the importance of this subject receives more prominence. Unquestionably there will always be a certain number of cases in which differentiation from appendicitis is impossible, but with histories carefully taken and examinations thoroughly made with these conditions in mind, the number of operative cases can be considerably reduced.

Case Reports

Case 1 (No. 820505). L. S., a 25-year-old, married woman, was admitted to the hospital complaining of acute intermittent pain in the right lower quadrant of the abdomen of a few hours' duration. The last period had occurred 2 weeks previously. There had been no previous attacks of pain.

At examination the temperature was 98.6°F., the pulse 84, and the white-cell count 9000. There was moderate tenderness in the right lower quadrant. There was no spasm and no rebound tenderness. Pelvic examination was negative.

A diagnosis of ruptured graafian follicle was made, and the patient was discharged in 2 days without operation.

Case 2 (No. 803835). J. W., an 18-year-old, unmarried woman, was admitted to the hospital with a chief complaint of acute, intermittent pain in the right lower quadrant of the abdomen, accompanied by vomiting and of several hours' duration. The last period had occurred 2 weeks previously. There had been no previous attacks.

At examination the temperature was 99.2°F., the pulse 96, and the white-cell count 10,000. There was definite tenderness in the right lower quadrant over McBurney's point. There was no spasm and no rebound tenderness. There was slight tenderness in the right side of the pelvis by rectal examination.

The diagnosis was thought to be either subacute appendicitis or ruptured corpus hemorrhagicum, but surgery was deemed advisable. At operation there was found a small amount of serous fluid and an unruptured corpus hemorrhagicum in the right ovary. The appendix was normal.

Comment. Cases 1 and 2 illustrate, respectively, the mild and the more severe symptomatology which may be caused by rupture of a graafian follicle.

Case 3 (No. 813540). M. D., an 18-year-old, unmarried woman, was admitted to the hospital complaining of acute pain in the right lower quadrant of the abdomen, radiating to the suprapubic region, of 6 hours' duration. Pain started during coitus. It was continuous and vomiting ensued shortly after onset. There was dizziness on standing and relief from the pain on lying down. The last period had occurred 26 days before onset.

Examination showed marked tenderness low in the right lower quadrant and over the symphysis. There was rebound tenderness and slight spasm. Vaginal examination showed marked pain on motion of the cervix. The right vault was tender, the left vault free, and no masses were felt.

At examination on admission at 4 a.m. the temperature was 98.6°F., the pulse 90, and the white-cell count 18,000. The white-cell count was 9000 at 9 p.m., and 8600 on the following day. An Aschheim-Zondek test was negative. The urine was negative.

The pain subsided on the day after admission, and the patient was discharged in 4 days with a diagnosis of ruptured corpus hemorrhagicum.

Case 4 (No. 897427). I. D., a 22-year-old, unmarried student nurse, was admitted to the hospital with a history of acute intermittent pain in the right lower quadrant of the abdomen of 24 hours' duration. The pain occurred directly over an old appendectomy scar. It did not radiate but became increasingly more frequent and severe. The patient vomited once and felt dizzy on two occasions. The last menses had begun 2 weeks before onset. For 4 years the patient had had dysmenorrhea and pain in the lower abdomen, lasting for 3 days to 2 weeks after her periods. An appendectomy had been performed 6 years previously.

On examination the patient was not acutely ill but complained of pain in the right lower quadrant of the abdomen. There was definite but not marked tenderness at the site of the old appendectomy scar. There was no spasm, mass or rebound tenderness. Slight radiation of tenderness was felt on palpation down to the middle of the symphysis. No rectal examination was made. The temperature was 98.6°F., the pulse 76, and the white-cell count 8500.

Surgical and gynecological consultants agreed on a diagnosis of ruptured corpus hemorrhagicum. The patient remained under observation for a week, during which time she had occasional slight pain on the affected side, and was then discharged without operation.

Comment. Cases 3 and 4 are virtually textbook pictures of ruptured corpora hemorrhagica, the former demonstrating the value of repeated white counts, and the latter the importance of a good history.

Case 5 (No. C735366). T. P., a 17-year-old girl, was admitted to the hospital complaining of acute periodic pain in the left lower quadrant of the abdomen, radiating down the left leg, of 2 weeks' duration. There was no nausea or vomiting. The bowels were normal. The appetite was normal. There had been no previous attacks. The appendix had been removed 2 years previously. The last period had occurred 2 weeks before onset.

At examination the temperature was 99.8°F., the pulse 100, and the white-cell count 10,000. The urine was negative. There was tenderness in the left lower quadrant in the region of the left ovary. There was no spasm and no rebound tenderness. Rectal examination showed tenderness in the left vault.

A diagnosis of a ruptured corpus hemorrhagicum was made, and the patient was discharged in 3 days when the symptoms had subsided.

Comment. This case shows symptoms persisting on the left side from which the ruptured corpus apparently came and also the ease with which these cases may be diagnosed if an appendectomy already has been performed.

Case 6 (No. 659307). M. O., a 14-year-old girl, was admitted to the hospital complaining of acute pain in the right lower quadrant of the abdomen, without radiation, of 3 days' duration. There was no nausea or vomiting. The appetite was poor. The bowels were normal. The last period had occurred 3 weeks before onset.

At examination the temperature was 99.6°F., the pulse 120 and the white-cell count 11,200. The urine was negative. There was tenderness in the whole right lower quadrant, without spasm. Tenderness was elicited high in the pelvis on rectal palpation.

A diagnosis of acute appendicitis was made and an operation was performed the day of entry. The appendix

was found to be normal, and a ruptured corpus hemorrhagicum was found in the left ovary with a small amount of free blood in the pelvis.

Comment. This case demonstrates that the symptoms from a rupture on the left side may occur on the right side.

CASE 7 (No. 649622). E. A., an 18-year-old, unmarried woman, was admitted to the hospital complaining of acute pain in the right lower quadrant of the abdomen of 5 days' duration. There was nausea but no vomiting. The bowels were normal. The last period had occurred 2 weeks before onset. The patient had had two similar attacks lasting for 4 days.

At examination the temperature was 99.4°F., the pulse 106, and the white-cell count 9000. There was tenderness over McBurney's point, but no spasm. Tenderness in the region of the cecum was shown by rectal examination.

A diagnosis of acute appendicitis was made and an operation was performed on the day of entry. An acutely inflamed appendix was found, together with free blood in the peritoneal cavity and a ruptured corpus hemorrhagicum in the right ovary.

Comment. This case illustrates the extreme difficulty in differential diagnosis and the possibility that acute appendicitis may be present simultaneously with a ruptured corpus hemorrhagicum.

CASE 8 (No. 777355). V. S., a 15-year-old girl, was admitted to the hospital with a chief complaint of acute intermittent pain in the right lower quadrant of the abdomen, without radiation, of 24 hours' duration. There was nausea but no vomiting. The last period had occurred 2 weeks previously. The patient had had several attacks.

At examination the temperature was 98.6°F., the pulse 80, and the white-cell count 17,000. There was tenderness in the right lower quadrant over McBurney's point. There was no spasm, and no rebound tenderness. The rectal examination was negative.

A diagnosis was made of acute appendicitis or ruptured corpus hemorrhagicum. At operation a ruptured corpus hemorrhagicum, still oozing blood, was found in the right ovary. There was considerable blood-tinged fluid in the pelvis.

Comment. Whether to intervene surgically in the above type of case would tax the judgment of even the most conservative surgeon.

CASE 9 (No. 644132). C. L., a 15-year-old girl, was admitted to the hospital with a chief complaint of dull pain in the right lower quadrant of the abdomen of 3 days' duration. There was no nausea or vomiting. The pain became gradually worse. The last period had occurred 3 weeks before onset.

At examination the temperature was 99°F., the pulse 96, and the white-cell count 7000. There was deep tenderness with slight spasm in the right lower quadrant. There was tenderness in the right vault on rectal examination. No masses were felt.

A diagnosis of acute appendicitis was made and an operation performed on the day of entry. There was found about 5 cc. of bloody fluid in the right side of the pelvis. There was a hemorrhagic cyst of the right ovary, unruptured and about the size of a walnut. Resection of the cyst was performed.

Comment. This case illustrates the continuous dull pain characteristic of the cyst cases, in contradistinction to the intermittent pain caused by a bleeding corpus luteum.

CASE 10 (No. 661313). M. O., a 28-year-old, unmarried woman, was admitted to the hospital complaining of acute pain below the umbilicus, radiating to the right lower quadrant of the abdomen, of 2 days' duration. The patient had vomited four times. The pain was constant and was somewhat relieved by flexing the right thigh. The last menses had occurred 26 days previously.

At examination the temperature was 99°F., the pulse 110, and the white-cell count 12,000. There was tenderness and spasm in the right lower quadrant. Rectal examination showed tenderness in the right vault. No masses were felt.

A diagnosis of acute appendicitis was made, and an operation was performed the day of entry. Considerable dark blood was found in the pelvis, and a ruptured hemorrhagic cyst the size of a small orange in the right ovary.

Comment. This case is a good example of the symptomatology accompanying a ruptured cyst when the fulminating symptoms of acute hemorrhage are absent.

SUMMARY

Two hundred and fifty-seven cases of pain due to ovulation and its sequelae are analyzed.

Differentiation from appendiceal lesions is shown to be the most difficult step in diagnosis.

The closer the attacks approach to the onset of the next period, the more severe the symptoms usually are.

Appendicitis and pain consequent to ovulatory phenomena may exist simultaneously.

The large percentage of cases of ruptured corpus hemorrhagicum, if diagnosed definitely, may be treated without operation, but the possibility of persistent bleeding necessitating surgical intervention must be kept in mind.

In women where a diagnosis of the milder forms of appendicitis is made and differentiation is not positive, a midline instead of a right-rectus or McBurney's incision should be made, in order to simplify exploration of the pelvis.

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THE ESTIMATION OF THE NUTRITIONAL STATE IN CHILDREN*

MANUEL M. GLAZIER, M.D.†

BOSTON

THERE have been many attempts to secure a suitable formula for use in the rating of the nutritional state. Data for weight, height, sex and age,[1] for weight, body build, age and sex,[2] and for arm, chest and hip measurements[3] have been suggested. Magee[4] advocates the substitution of measurements of physical performance for those of physical development. Harris[5] suggests that determination of specific deficiencies in the vitamins and in iron, by means of laboratory tests now available, could be used. These proposals have various degrees of value for studying the state of nutrition, but there is doubt of their being both adequate and practical.

Be this as it may, there is considerable confusion and difference of opinion regarding the estimation of the state of nutrition in children. This point was well illustrated by Dunstan,[6] of England, in 1937, and by Derryberry[7] in 1938. Both reported the results of surveys in which a specified number of experienced physicians or pediatricians independently examined the same group of children and determined their nutritional states. The results showed such wide individual variations that both authors perceived a pressing need for a more exact measure of the nutritional state. The purpose of this paper is to present such a standard of measurement, which has been developed as a result of observations in a large number of children over a five-year period.

MATERIAL AND PLAN OF INVESTIGATION

The subjects used in this investigation consisted of 556 children between the ages of two and twelve, who were followed from 1933 through 1937. One group was composed of 287 children who attended the first four grades of a primary school in Revere, and were for the most part from families whose yearly income was from $1000 to $2000. Another group included 269 consecutive cases from the Outpatient Department of the Boston Dispensary, which gives medical service to a comparatively low-income section of the population.

Information concerning the physiological symptoms in the school group was gathered by a group of students§ from the Tufts College Medical School who visited the children's homes. The rest of the study was done by me.

A suitable standard for the appraisement of the nutritional state in children should not only be based on accurate principles but should also be practical and applicable to and adequate for every child. Apparently these requisites are fulfilled in the co-ordination of the physical and physiological aspects of the nutritional state presented in the following scale, which was applied to all cases in this series:

A. Physiological aspect or functional symptoms:
   - *a.* Appetite
   - *b.* Activity
   - *c.* Character of stools
   - *d.* Sleep
   - *e.* Frequency of infection

B. Physical aspect:
   - *a.* Family tendency or inheritance
   - *b.* Physical development
     1. Interval gain in weight and height
     2. Physical examination

The combination of A and B determines the nutritional state.

The definition of nutrition as "a study of foodstuffs and the biochemical processes which utilize them"[8] can be interpreted by saying that the state of nutrition of a child is equivalent to his growth and function. Since growth is analogous to physical aspect, and since function is closely related to physiological aspect, it was thought that a clinical measure of the nutritional state could be evolved by appraising separately and then co-ordinating both the physiological and the physical aspects of each subject.

The reflection of the physiologic processes was ascertained by taking a history of the appetite, activity, character of stools, sleep and frequency of infection. These symptoms were used as an index to body function and were called functional symptoms. Their proper interpretation required the analysis of each symptom as a complete unit, and as a link in the chain of the entire group.

The physical aspect of nutrition was evaluated from an estimate of the inherited trends and from the physical development of the child. The latter included the increment of growth (a history of the interval gain in weight and height) and the clinical evidence obtained from a physical examination. Special emphasis was placed on the state of the soft tissues and skeletal structure and the presence of foci of infection.

*From the Department of Pediatrics, Tufts College Medical School, and the Children's Clinic, Boston Dispensary.

†Assistant physician, Children's Department, Boston Dispensary; instructor in pediatrics, Tufts College Medical School.

§Messrs. J. Guralnick, W. Lulow, G. Rothblatt and A. Wolbarsht.

Classification

As judged by the nutritional scale described above, the cases fell naturally into three groups: those with good, fair and poor nutrition. The groups were compared with one another as regards appetite, sleep, familial tendency, foci of infection, dietary deficiency and age. There were 332 cases in Group 1, 151 in Group 2 and 73 in Group 3. Group 1 included the children with excellent physiological and physical aspects. This meant that the biochemical processes were proceeding correctly, or that a state of good health was present. Group 2 included the children with some impairment of either the physiological or the physical aspects. It represented a transitional or intermediate state, which might improve to one of good nutrition or regress to one of malnutrition. Group 3 included children with impairment of both the physical and the physiological aspects. Undoubtedly some abnormal circumstance had impaired the operation of the biochemical processes, and a state of poor nutrition was present.

Progress of Children Whose Nutritional State Changed

The study of 30 children whose state of nutrition changed during the years of this investigation showed that the first sign of improvement in children with malnutrition under treatment resulted in an improved physiological state. The appetite improved, sleep was more restful, the bowel movements became regular, and fatigue lessened or even disappeared. After the functional symptoms had become normal the malnutrition changed to fair nutrition. The period of time required for this change varied from several days to several weeks.

Fair nutrition became good nutrition when the child developed normal physical signs. This change usually required from four weeks to eight months.

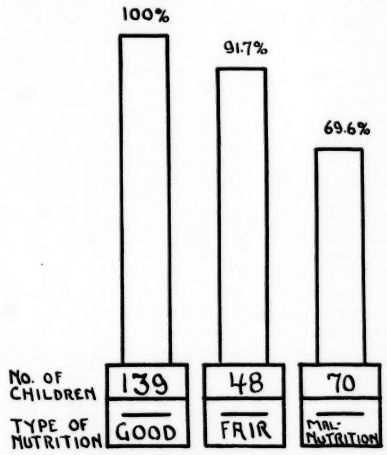

Figure 1. *Percentage of Children with Adequate Appetites in Relation to the State of Nutrition.*

Changing the child's nutritional state from good to fair required various periods of time, depending on the degree of infection or the dietary deficiency. The first sign of regression was a change in the functional symptoms, with impairment of appetite, sleep, activity and the character of stools.

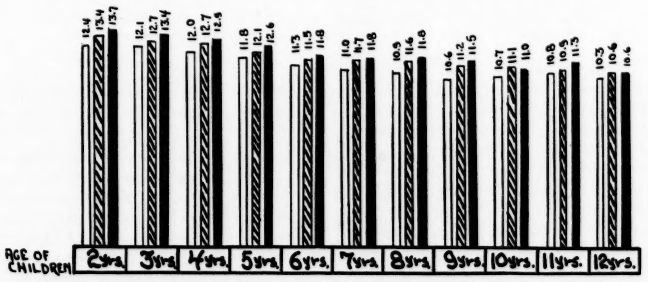

Figure 2. *Required Daily Sleep in Relation to the State of Nutrition and to Age.*

The open blocks represent patients with good nutrition, the cross-hatched ones those with fair nutrition, and the solid ones those with malnutrition. The height of the blocks and the superimposed figures represent the hours of sleep required daily.

Continued regression resulted in poor posture, poor tissue turgor and other signs of malnutrition.

Aspects of Nutrition

Physiological

There was a clear relation between a child's appetite and his nutritional state. All of 139 children with good nutrition had good appetites. Eight per cent of 48 children with fair nutrition had poor appetites, while 30 per cent of 70 children with poor nutrition had poor appetites (Fig. 1).

Children with good nutrition in the same age group generally required less sleep than did those with malnutrition (Fig. 2). From the age of two to nine years there was a difference of one hour. From ten to twelve years there was practically no difference. In groups with similar nutrition there was only one hour's difference in the amount of sleep required daily between the ages of six and twelve.

Data concerning the frequency of infection and of fatigue in relation to the state of nutrition were not accurately recorded. However, it is our impression that infections and fatigue were distinctly more frequent in children with poor nutrition.

Physical

In the 108 children studied for the influence of heredity on height, the latter apparently followed the familial tendency in the majority of cases. However, 37 children were taller than the group average of children from parents in the next taller group (Fig. 3).

The rate of growth was determined by observing height and weight changes over specific periods of time. These changes varied greatly and were subject to familial tendency, age, time of year, sex and the presence of infection. The gain in weight varied from 3 to 16 pounds per year. Although not accurately determined, it appeared that the gain in children with good nutrition was greater than that in the others.

There appeared to be no special significance between height and the type of nutrition.

The distribution and amount of skin, fat and muscle frequently showed marked variations in each child. The kind of skin was not specifically related to the state of nutrition. The tone of both muscle and subcutaneous fat was excellent in children in good physical condition, while those in poor physical condition had soft or flabby tissue turgor. Children with fair nutrition had tissue turgor that ranged from soft and flabby up to the point when it became firm enough to be termed the equivalent of that in those with good physical condition.

The posture was usually dependent on the tissue turgor. In young children with poor tissue turgor resulting in the typical signs of poor posture, improvement in tissue turgor resulted in a gradual change to good posture. A distended abdomen was the last sign to disappear, and frequently years were required for this change to occur.

The relation between disease and the nutritional state was marked. Practically every child in the group with malnutrition had a focus of infection or a dietary deficiency (Fig. 4). Thirty per cent of the outpatient children with fair nutrition had a focus of infection or a dietary deficiency. Forty per cent of the same group among the school children were similarly affected. Twenty-three per cent of the outpatient group with good

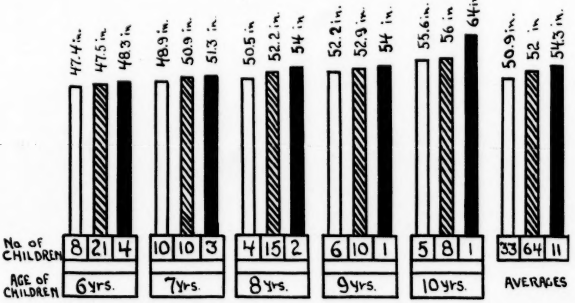

Figure 3. *The Height of Children in Relation to That of Their Parents and to Age. The open blocks represent children with short parents, the cross-hatched ones those with parents of medium height, and the solid ones those with tall parents. The height of the blocks and the superimposed numbers represent the height of the children in inches.*

nutrition had a focus of infection or a dietary deficiency. Seventeen per cent of the school children with similar nutrition had a focus of infection or a dietary deficiency.

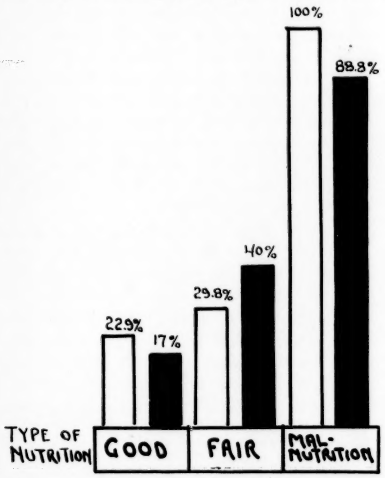

FIGURE 4. *Percentages of Children Having Evidence of Dietary Deficiency or a Focus of Infection in Relation to the State of Nutrition.*

The open blocks represent children seen in dispensaries, and the solid blocks school children.

Among the 242 children studied in relation to age and the nutritional state, the incidence of malnutrition appeared to be greatest at the age of two, when it was 50 per cent. At succeeding ages the incidence of malnutrition gradually decreased, until it reached its minimum of 9 per cent at the age of eleven (Fig. 5).

DISCUSSION

In determining the nutritional state each child was considered a clinical entity. In attempting to interpret the physiological symptoms it was found that healthy children of the same group varied markedly in appetite, activity, sleep and gain in weight and height; consequently they could not be judged by their group averages, which showed distinct variations. This was illustrated by one six-year-old boy with good nutrition, who required ten hours of sleep daily, while another boy of similar age and nutrition required thirteen.

Intelligent interpretation of the physiological or functional symptoms requires their analysis both individually and as a group. In this way proper emphasis can be placed on the exaggerated symptoms or those due to either an overestimation or an underestimation of a true functional state, both of which necessitate repeated visits in order to determine the true character of the symptoms.

Heredity was found to influence definitely the type of skeletal structure in the child. The familial tendency as regards the type of skeletal structure was determined by securing information about the skeletal structure of parents, grandparents, aunts, uncles, brothers and sisters. The type of skeletal structure during childhood and early adulthood gives most accurate information, for the sedentary life of adulthood frequently re-

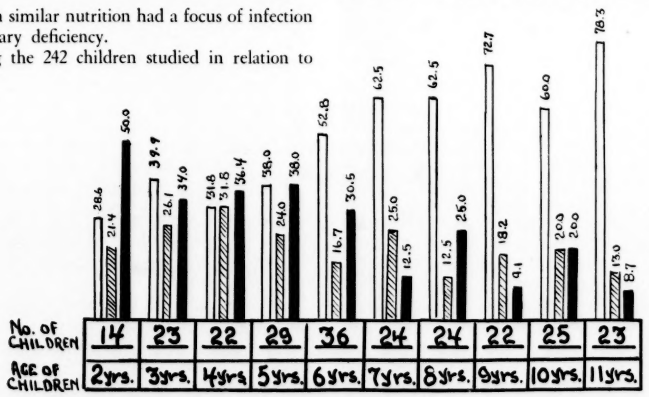

FIGURE 5. *The State of Nutrition in Relation to Age.*

The open blocks represent children with good nutrition, the cross-hatched ones those with fair nutrition, and the solid ones those with malnutrition. The height of the blocks and the superimposed numbers represent percentages.

sults in the general deposit of a layer of subcutaneous fat that masks the true skeletal contour.

Summary and Conclusions

In an attempt to develop a practical and accurate standard for the estimation of the nutritional state in children, 556 children between the ages of two and twelve were studied during a five-year period. The estimation of the nutritional states was accomplished by analyzing and coordinating the findings of the physical and the physiological aspects of each child.

Application of this procedure produced three nutritional classes, described as good, fair and poor. "Good nutrition" included children with good physical and physiologic states. "Fair nutrition" included children with either the physical or the physiologic state impaired. "Poor nutrition" included children with impairment of both the physical and the physiologic states. The nutritional state became better or worse as the physiological symptoms and the physical signs improved or regressed.

Although the majority of children followed a definite familial tendency so far as height was concerned, 34 per cent of them did not.

There were fewer complaints of poor appetite as the nutritional state improved. The required daily sleep in children with a better nutritional state averaged about one hour less than that in those with a poor nutritional state.

Foci of infection and dietary deficiency were present more frequently in those with poor nutritional states. However, 20 per cent of the children with good nutrition had an apparent focus of infection or a dietary deficiency.

Good nutrition, which was least common in early childhood, gradually increased with age and was commonest in later childhood. Malnutrition, which was commonest in early childhood, occurring in 50 per cent of cases at the age of two, gradually decreased with age until it reached 9 per cent at the age of twelve.

The results suggest that this standard is practical and applicable to and adequate for every child. Moreover, with definite guideposts to follow in the interpretation of the nutritional state, there should be less confusion and variation in results than are now present.

311 Commonwealth Avenue.

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"COMMON COLDS"

Naomi C. Turner, Ed. M.

Arlington, Massachusetts

STUDIES among several groups of school children support the theory that a variety of microorganisms may act as the inciting agent in the production of upper-respiratory infections which are classed as "common colds." Groups of pronounced colds requiring numerous absences from school have been observed to appear consistently toward the end of the incubation period following the exposure of a class to a communicable disease spread through the secretions of the respiratory tract.

From October to June, I watched the interplay of colds and other communicable diseases in a nursery school of twelve pupils. Through the courtesy of the director, a daily notation was made for each child, throughout the school year, covering respiratory symptoms and the cause of any absence which occurred. The only series of colds for the entire year followed exposure of the children to chicken pox.

A three-year-old child attended school on November 5 and 6. The right nostril was red, and there was mucus in the left nostril. A diagnosis of chicken pox was made on November 7. On November 17, twelve days after the initial exposure, every other child in the class except two was kept at home for a cold. One of those remaining at school had mucus in the nostrils. The other had had chicken pox previously and went to bed with a cold one week later, the nineteenth day after exposure to chicken pox. We find, then, that within two or three weeks after exposure to

chicken pox every child in school had had a severe cold.

At no other time during the year did the group as a whole suffer from colds, nor were there any other cases of chicken pox, measles, scarlet fever, whooping cough, mumps or diphtheria. In several cases a child had sniffles or a cough which developed into a cold, but the infection did not affect the group as a whole.

This experience was sufficiently suggestive to make me think that observation of a larger group of children would be worth while. In a public elementary school, whose total enrollment was 598, I watched 160 children in the kindergartens and first grades from February 12 to May 28. In addition a second-grade class of 32 children was observed for a briefer period. The classes were followed during exposure to scarlet fever, measles and chicken pox. The same policy of notation for each child for each day was carried on.

In one kindergarten class of 33 children, which we shall call "KSa," there were definite exposures to scarlet fever, measles and chicken pox. Here, too, the peak of respiratory symptoms seemed to come near the end of the incubation period of the disease to which there had been exposure. For example, seven days after the exposure of these children to scarlet fever by a child who vomited in the classroom and left school with a fever of 102°F., 12 children of this class exhibited symptoms of upper-respiratory infection. Two other children developed scarlet fever within this week without further exposing the class.

The only other times when such a peak of upper-respiratory symptoms was approached were fourteen days following a class exposure to measles, when 9 children had colds; nineteen days following an exposure to chicken pox, when 8 children showed respiratory symptoms; and twenty-one days following a second exposure to chicken pox, when the number again reached 8. These facts take on added significance when it is recalled that the incubation period for scarlet fever is from two to seven days, that for measles ten to fourteen days, and that for chicken pox two to three weeks.

It is interesting to note that on March 10, when among the 33 children in KSa, seven days after exposure to scarlet fever, there were 12 children exhibiting upper-respiratory symptoms, the other four classes (124 children) which were being observed had a combined total of only 8 children either absent for a cold or showing upper-respiratory symptoms.

The co-operation of the principal of this school, together with the help of the teachers and the school nurse, made it possible to continue observations during the next school year from September 8 to December 24 on a still larger group, made up of 318 children distributed among two kindergartens and three first-grade, three second-grade and three third-grade classes. Causes of absences were noted, whether from communicable diseases, colds or otherwise; notations were also made of such upper-respiratory symptoms as could be observed in the classroom during ten- or fifteen-minute daily visits.

During the period of observation, five classes participated in a definite measles epidemic. This fact makes the upper-respiratory data difficult to follow. In general a peak of upper-respiratory symptoms was found among the other children on the day that the new cases occurred. Five of six teachers in whose classrooms measles was prevalent were out with a cold from one day to a week during the period of the class exposure.

With the outbreak of measles in a classroom, it was noticed that upper-respiratory symptoms were common among those who did not develop measles as well as among those who were coming down with the disease. Of 11 children known to be immune to measles in one second-grade class, 6 had marked upper-respiratory symptoms during the height of the epidemic; 3 had slight upper-respiratory symptoms and 2 were well. In a first-grade class which was subjected to two exposures to measles between March 21 and April 16, each of the 13 children immune to measles exhibited upper-respiratory symptoms.

During the fall of 1937 there was an incident in a fourth-grade class which is of interest. A boy was exposed to scarlet fever on September 9 by playing with a girl who on September 10 was diagnosed as having scarlet fever. He vomited on September 18, but was not otherwise known to be unwell except for having an earache. On October 14 he developed mastoiditis, for which he was taken to a hospital. There it was discovered that he was peeling, and a report was made to the principal that the boy had been attending school while having a mild case of scarlet fever. It is of interest to note what had occurred among his classmates. He was in school September 17 and also September 20 to 27; he was absent September 28 to have his ear treated. From September 20 to 29, 11 children in this class of 37 pupils were absent with colds. At this time the other classes under observation in the school, from kindergarten through the third grade, were having excellent attendance, with very few absences on account of colds.

During the fall of 1937 a mild epidemic of chicken pox occurred in a first-grade classroom of 29 children. On October 26, a boy was kept at

home with a diagnosis of chicken pox. Sixteen days from October 25, a second boy who sat diagonally in front of the first, began to show symptoms of chicken pox, and 8 other children either showed upper-respiratory symptoms in the classroom or were absent with colds. The third week after the first exposure to chicken pox, the class showed its maximum of absences for colds and upper-respiratory symptoms for any week from September 8 to December 24; 10 children had colds sufficiently severe to require home care. During this week among 289 children of the ten other classes being observed there were only 36 children who were absent for colds. Thus we see that with 10 absences from the first-grade classroom 34 per cent of the children were absent on account of colds, compared with 12 per cent in the ten other classes.

I recognize that no positive conclusions can be drawn from such data. But so frequently have the records shown an increase in the number of children having upper-respiratory symptoms toward the end of the incubation period following class exposure to certain communicable respiratory diseases that these organisms seemed to be indicated as the cause of such infections. This evidence suggests that the etiologic agents of various communicable diseases may manifest their presence, more frequently than is recognized, through symptoms usually thought of as those of the common cold.

Some of the recent public-health literature[1] suggests that the common cold is caused by a filterable virus, and that other organisms involved are always secondary invaders. In considering this filterable virus, it should be remembered that all that has been shown is that a single filterable virus can act as a causative agent in initiating cold-like symptoms. Common experience indicates that to accept the notion that a single virus is always the causative organism would lead to a false sense of security and many false expectations.

Certain well-recognized facts substantiate the belief that the causative organisms of upper-respiratory infections are various. In the first place, upper-respiratory symptoms may arise from several of the so-called "children's diseases." Measles is especially contagious when the catarrhal symptoms are manifest. Wagener[2] describes mild catarrhal attacks of measles during epidemics in adults who have had the disease. He believes these to be atypical cases. When measles appears first among aboriginal populations, it sweeps through them with a violence unknown among more civilized nations in which the disease has been endemic for centuries. The symptoms of scarlet fever may be very mild: fever may be absent, the throat may be only slightly congested, and the eruption may be so slight as to be hardly recognizable. Yet mild as well as severe cases may be followed by serious sequelae. Scarlet fever is only one manifestation of streptococcal infection. It is well known that a typical case can infect a milk supply, with a resulting epidemic of septic sore throat. Adults and older children who have been exposed to scarlet fever sometimes develop only a simple tonsillitis.

In the second place, in all epidemics there are a large number of unrecognized cases. Such abortive and missed cases are commonly spoken of in epidemics of anterior poliomyelitis, scarlet fever, mumps, chicken pox, measles and whooping cough, and in the majority the presence of specific immunity can be demonstrated by proper laboratory procedures. In Palestine, colds are common but diphtheria and scarlet fever were once thought to be nonexistent. It has now been shown that both diphtheria and scarlet fever do occur, but in such a mild form that they were formerly unrecognized.[3]

Careful attention to the abortive forms of disease might help to interpret many so-called "colds." In pneumonia such unrelated bacteria as the pneumococcus and Friedländer's bacillus are able to cause very similar clinical and pathologic conditions. The possibility that various organisms are the etiologic agents for the common cold has important implications with respect to the care of colds. Perhaps physicians and parents who keep children at home and in bed for minor colds are in reality helping to abort other common communicable diseases which infect the upper-respiratory tract.

Special care of fatigue and attention to weather exposure near the end of the incubation period of a common communicable disease to which there has been exposure in the school, family or office may conceivably cut down the incidence of the common cold. If upper-respiratory infections called "colds" are due to various organisms, these infections will have different incubation periods rather than a constant one- to three-day period. The concept of the variable nature of upper-respiratory infections has far-reaching hygienic implications.

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DR. KUBIK: Yes, that is another feature which was different from the picture usually seen in cases with subarachnoid hemorrhage.

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CASE 26052

PRESENTATION OF CASE

First Admission. A thirty-one-year-old man was admitted to the emergency ward complaining of epigastric pain.

About three or four days before admission the patient suddenly had an attack of left upper quadrant and epigastric abdominal pain. The attack followed a heavy meal, and was associated with much belching and nausea, but with no vomiting or marked anorexia. He stated that a similar episode occurred four years before entry. He was then seen in an outside hospital where a diagnosis of "ulcer" was made, but without x-ray studies. He allegedly passed one tarry stool two years before admission, but none since. A blood Hinton test done seven years before entry was negative.

The patient had been a chronic arthritic for some twenty-five years, and for twelve years had led a bed-and-chair existence. There were no other illnesses, past or present.

Physical examination revealed a thin, poorly developed and nourished, bedridden man whose spine was rigid, with a slight upper dorsal kyphosis. There were moderate flexion deformities of the elbows, hips and knees, with accompanying muscle-group atrophy. Examination of the heart and lungs was negative. The epigastrium was slightly tender, but without spasm. The remainder of the physical examination was normal, as were the blood and urine. The blood pressure was normal.

The temperature, pulse and respirations were normal.

A gastrointestinal x-ray series showed no evidence of disease in the esophagus. The stomach had prominent mucosal markings and quite active peristalsis. In the lower part of the antrum on the side of the greater curvature there was a round, rather lobulated, small hemispherical, intramural, extramucosal tumor which measured 2.5 cm. in length and 1.5 cm. in height. The pylorus opened readily, filling a normal duodenal cap. He was discharged from the emergency ward on the second hospital day.

Second Admission (six months later). Four days before entry the patient was suddenly seized with an attack of nausea, followed shortly by the vomiting of recently ingested food. Since that time he had continued to vomit "everything" he ate, the vomiting usually occurring about one or two hours after the ingestion of food. His upper abdomen became tender and distended. He was able to pass gas by rectum, but no bowel movements had occurred since his first attack of nausea. The physical examination was unchanged from that above, except that his abdomen was distended and tympanitic, with diffuse tenderness, most marked in the epigastrium. Peristalsis gave a high-pitched note and was not heard except at infrequent intervals.

The blood showed a white-cell count of 8500. The serum chlorides were equivalent to 95 cc. of N/10 sodium chloride per 100 cc., and the serum protein was 6.6 gm. per 100 cc. A flat x-ray film of the abdomen showed several air-filled dilated loops of small intestine, visible particularly in the right lower abdomen. The colon was air-filled but not distended. With Wangensteen drainage, enemas, parenteral fluids and a blood transfusion, the patient improved. About twelve days after admission an exploratory laparotomy was performed.

DIFFERENTIAL DIAGNOSIS

DR. CLAUDE E. WELCH: May I see the x-ray films?

DR. AUBREY O. HAMPTON: The filling defect described in the lower third of the stomach on the greater curvature is quite obvious in these films. It does appear to be extraluminal, but you can rarely be quite sure that a tumor is submucosal because the mucosa is stretched over the lesion so tight that one cannot always recognize it. So far as I can say, this one is very likely to be submucosal. It does not look like a polyp. It is a sessile-appearing intramural defect. The mucosa around it is absolutely normal. The film taken on the second admission does show signs of small-bowel ileus or obstruction. The colon contains gas, and so does the stomach. The small bowel is enormously dilated. There is also some dense substance that looks like bismuth in the colon. I do not believe there is evidence of obstruction in the colon.

DR. WELCH: So the initial diagnosis is easy. It is quite obvious that we are dealing with a tumor of the stomach plus superimposed intestinal obstruction. From this point on we progress on rather thin ice because quite a number of probabilities and possibilities have to be discussed.

Is there anything in the past history that would be of any advantage in this discussion? I expect

that his two previous attacks of pain were due to a lesion that will be discovered in the bowel rather than to the one in the stomach. We can obviously rule out the diagnosis of ulcer, and I think we had better regard the tarry stool with a good deal of suspicion because it is not confirmed by any other test. At the time of admission, in the emergency ward, we have no data of interest except for the x-ray examination. The commonest lesion in the stomach in that location is a leiomyoma or possibly a leiomyosarcoma. Two other things to be considered are neurofibroma, which occasionally occurs within the wall, and pancreatic rest, although the mass is large for the latter. We should also consider polyp, which I think we can rule out by the x-ray picture. Carcinoma, if we can trust the x-ray report, which is usually the most accurate part of the record, we can rule out. The possibility of lymphoma remains and must be seriously considered. The picture, of course, is unusual for that of lymphoma in that the tumor is well localized without induration of the wall surrounding it; on the other hand, a submucosal lymphoma must be kept in mind.

Apparently this disease had been progressive or he had developed some other disease when he came in with intestinal obstruction. The stomach tumor may have been an entirely different lesion from the one that was producing intestinal obstruction; on the other hand, the two may be related.

Let us proceed then with a diagnosis of intestinal obstruction and see if we can rule in a diagnosis that might coincide. In the first place, the obstruction of the small bowel, judging from the amount of gas-filled intestines we see, was probably low in the ileum; furthermore it was not a complete obstruction, for there is gas in the colon and gas was passed quite freely by rectum. I do not believe we have any evidence to indicate that this was a paralytic ileus, because peristalsis persisted and he had a white-cell count of 8500 and, I assume, a normal temperature. In other words there was a mechanical obstruction of some type.

If we consider the causes of mechanical intestinal obstruction we can rule out several of them immediately. The commonest, of course, is hernia. There was no evidence externally, and internal hernias are so rare we can drop them from our discussion. Could it have been a foreign body of some type, a food bolus or a gallstone? The previous attacks of abdominal pain would make one consider gallstone. On the other hand, about half the gallstones that obstruct the small bowel are visible on flat plates of the abdomen. We see no area of density here. Furthermore, the patient lived for twelve days and apparently improved. That would be highly improbable with gallstone obstruction, which usually progresses rapidly to a lethal exitus unless the stone is removed. Could it have been volvulus? The patient was alive twelve days afterward; volvulus would undoubtedly by that time have led to infarction and peritonitis. The attack was not typical of intussusception in any respect. A mesenteric thrombosis seems to be ruled out by the normal white count, by the blood pressure and by other features that are not typical.

So we are left with two types of obstruction that we need to consider seriously. One is that due to bands or adhesions of some type and the other is that due to tumor. Obstructions due to adhesions usually follow abdominal operations. This man had not had a previous operation. He conceivably could have had congenital adhesions or some band arising around the base of a Meckel's diverticulum. But we have no positive evidence to lead to that diagnosis. What kind of tumors would produce such an obstruction? If this was in the lower ileum, the commonest tumors we have to deal with are lymphoma, leiomyoma, fibroma, carcinoma and carcinoids. Of that entire group lymphoma is the commonest. The fact that lymphoma is frequently a multiple tumor and the fact that there was also a tumor in the stomach incline us somewhat toward that diagnosis. Leiomyomas frequently produce gross intestinal bleeding, a symptom for which we have no evidence. Again, if I am going to make one diagnosis cover both lesions, it is unusual to have two leiomyomas in the same patient. Fibroma of the lower bowel rarely attains sufficient size to produce intestinal obstruction. Primary carcinoma of the lower ileum is possible but is not so common as it is in the jejunum or duodenum. A carcinoid is a rare tumor which is frequently multiple, but it is extremely rare in the stomach. So it is with a great deal of trepidation that I come down to a final diagnosis that will cover all the difficulties in this patient. I have ruled out all the common things such as carcinoma of the stomach, with metastases, bands and adhesions, and I should say that we are dealing with multiple tumors, which, on the law of chance, will prove to be lymphomatous.

DR. RICHARD H. WALLACE: This man had two extremely unusual and entirely unrelated findings. The first operation was done for small-bowel obstruction, the nature of which we did not know. The point of obstruction was in the pelvis. The whole abdomen was filled with not only greatly dilated but greatly thickened loops of small bowel, such as are found in cases with chronic obstruc-

tion. The terminal ileum was entirely collapsed. The obstruction was produced by a large Meckel's diverticulum which contained about 300 cc. of liquid fecal material and was distended to the thinness of a rubber balloon. There was no evidence of inflammation, and no adhesions. The diverticulum was entirely free, with no twist or impairment of blood supply, and in lifting the tip all the fluid very readily ran back into the bowel.

This is especially interesting to me because in 1933 Dr. Richard H. Miller and I* looked up all the cases of Meckel's diverticulum in this hospital, and of the cases that had symptoms over 85 per cent had obstruction and of all the latter there was not a single case with a non-inflammatory or non-adherent diverticulum.

We removed the diverticulum, then felt the pyloric end of the stomach which seemed very much as described by x-ray, there being a 2.5-cm. rubbery smooth mass, which seemed to be in the wall of the stomach. We thought it was probably a leiomyoma and felt that it ought to be removed. Approximately three weeks later we re-explored the patient and did a subtotal resection.

Clinical Diagnoses (Preoperative)

Small-bowel obstruction.
Leiomyoma of stomach.

Dr. Welch's Diagnosis

Malignant lymphoma of stomach and ileum.

*Miller, R. H., and Wallace, R. H.: Meckel's diverticulum in acute abdominal emergencies. *Ann. Surg.* 98:713-721, 1933.

Anatomical Diagnoses

Meckel's diverticulum, with intestinal obstruction.
Ectopic pancreas (adenomyoma) of stomach.

Pathological Discussion

Dr. Tracy B. Mallory: When the resected portion of the stomach was examined it was apparent that the mucosa had been elevated over a considerable area by an underlying intramural tumor. The mucosa itself was normal except for a small but clearly visible dimple overlying the central part of the tumor. On section it was evident that the tumor was circumscribed but not encapsulated and involved submucosa, muscularis and even serosa. On microscopical examination it was found to consist of irregularly intertwining bundles of muscle fibers surrounding small groups of epithelial cells. Most of these consisted of ducts or glands lined with high columnar, mucus-secreting epithelium similar to that seen in the ducts of the pancreas. One area contained recognizable gastric epithelium with clearly apparent chief cells. No pancreatic acinar cells were found, but in the depths of the tumor were several characteristic islands of Langerhans, so the pancreatic nature of the rest appears established beyond doubt.

These are the tumors which have often, in the past, been described as adenomyomas. Occasionally only the rather non-specific ducts are present, but usually some other pancreatic elements can be identified if enough sections are cut. The inclusion of functioning gastric epithelium is, in my experience, quite unusual.

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PROBLEMS BEFORE THE MEDICAL PROFESSION

The development of medical knowledge, technology and material appurtenances during relatively recent years could hardly have been expected to occur without resulting in many changes in the practice of medicine. A similar development has occurred in other fields of human endeavor where advances in science have resulted in increased effectiveness. These developments not only have provided new implements, new methods and new products but also have effectively changed industrial and commercial organization and social and political economy.

One sees in retrospect the growth of scientific knowledge as the progress of man's control over natural forces, the development of his environment, and the acquisition of an independence from supernatural and traditional authority. In the Renaissance there were the voyages of the great explorers, the flowering of art and commerce and the Protestant Reformation. Vast continents opened up, industrial revolution occurred, traditional dependency declined. In this environment the seeds of democracy germinated, and not by chance flowered best in America where the vast opportunity for expansion provided the ideal conditions for the social expression of individual equality and independence. Later when the frontier had gone and America came of age there followed a period of consolidation and organization, a supplementation by mechanization and instrumentation of the no longer expansible geographic environment. New advances in science still contributed to man's control over natural forces, to bigger and better tools and products, but they entailed a dependence of man himself on the ever-increasing instruments of production. The economic independence of groups continued, but the economic independence of the individual declined. And in so far as this has occurred, the democracy of individualism, which developed as the social expression of individual equality and opportunity, no longer reflects the social demands. Trusts and corporate bodies grow to provide the machinery of production. Unions and co-operatives develop to defend the interests of the individuals. Society takes on a form and government a function that limit the rights of individuals.

Medicine has not and probably cannot escape this general trend. It is faced with problems of consolidation and organization. As medical science and practice have developed, the equality and independence of physicians have been limited, as witnessed, for example, by the prevalence of so-called "closed staffs." And just as individuals in other walks of life have created organizations to cope with the increasing intricacies of their occupations, so physicians have developed medical societies, clinics, group practices and boards of specialties. And, paradoxically enough, these attempts to solve the problems which have threatened the independence and individual rights of physicians have in many ways infringed upon them. But the clock cannot be turned back.

Neither will it avail to stand aside pointing to the record of the past, while society, intent on its struggle with the present, moves on.

If the medical profession is to direct its future course, it must face reality. And in so doing, it is well to remember that the present problems concerning the distribution of costs and organization of medical service arise from the very developments that have contributed to the advance of medicine in the past. Unless these problems are considered with a tolerance and judgment which are consistent with constructive action toward their solution, further advances may be impeded. For, if the consideration becomes a contention of prejudice and emotion, little progress will be made, much harm may be done, and the problems will remain.

COMMUNITY FUND CAMPAIGN

As this issue of the *Journal* goes to press, the success of the 1940 Community Fund Campaign is being shaped by Greater Boston's people. A minimum of $4,625,000 must be reached by February 6.

At the end of the first day, the Physicians' Group showed a 17 per cent increase over its contribution of last year, thus doing a fine job toward making this year's campaign the biggest ever. Each physician should have a genuine sense of personal responsibility for the success of the Fund. Only in this way can the goal be attained, and the Community Fund *must* succeed, since it is vital to the well-being of the people of Greater Boston.

MEDICAL EPONYM

Babinski's Phenomenon

Joseph Babinski (1857–1932) described this sign in the *Comptes rendus hebdomadaires des séances et mémoires de la Société de biologie* (**48**: 207, 1896). The title of the article is "Sur le réflexe cutané plantaire dans certaines affections organiques du système nerveux central [Plantar cutaneous reflex in certain organic affections of the central nervous system]." The translation of a portion of the article is as follows:

> I have observed in a certain number of cases of hemiplegia or monoplegia involving the leg which were associated with an organic affection of the central nervous system, a disturbance in the plantar reflex of which I here present a short description. On the healthy side, pricking of the sole of the foot causes a flexion of the thigh on the pelvis, the leg on the thigh, the foot on the leg, and the great toe on the metatarsus. This also occurs in normal persons. On the paralyzed side, a similar stimulus also gives rise to a flexion of the thigh on the pelvis, the leg on the thigh, the foot on the leg, but *the great toe, instead of being flexed, is extended on the metatarsus.*

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

Raymond S. Titus, M.D., *Secretary*
330 Dartmouth Street
Boston

Puerperal Infection Following Normal Delivery

Mrs. F. H., a twenty-eight-year-old woman, on the morning of August 12, 1936, five days after a normal delivery of her second baby, had had a chill, followed by a temperature of 103°F. and a pulse of 120.

The family history was irrelevant. The patient's past history was negative except for a tonsillectomy. Catamenia began at twelve and had never been regular until her marriage. Her last period had begun on November 2, 1935, making her expected date of confinement August 9. The previous pregnancy had ended in a normal delivery on July 1, 1935, but the baby lived only six weeks.

The recent pregnancy had been normal throughout. She was delivered normally of an 8 pound, 12 ounce, female child after median episiotomy. The placenta and membranes were delivered intact, and there was no bleeding after delivery.

Convalescence was normal until the fifth postpartum day, as stated above. Examination at that time showed the uterus not enlarged. There was an indefinite deep mass in the left breast. The lochia was sticky and dark, and a stained smear showed gram-positive cocci in chains and gram-negative bacilli; a culture yielded hemolytic streptococci and colon bacilli. That afternoon the temperature came down to 100.4°F. and then went up to 104. On August 13 the morning temperature was 102.8°F.; in the afternoon it rose to 102, with a pulse of 120. The next day the temperature was normal, and remained so throughout the rest of the hospital stay. Because of the short duration of the temperature, conservative treatment was instituted. The baby did not nurse.

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

Comment. The sudden rise in temperature five days post partum, while unusual in puerperal infection, is not uncommon. The source of the infection was discovered by bacteriological examination. At the onset of the fever there was an indefinite lump in one breast which might have led one to think that the breast was responsible. However, for a temperature of 104°F. on the fifth day following delivery to be caused by a breast infection is most unusual. The uterus was normal in size; it was not tender. There was no tenderness in the abdomen. The lochia was not normal; it was sticky and dark-colored, and the smear and culture showed the infective agents. The treatment was entirely conservative so far as the uterus itself was concerned. Ice was applied to the fundus, and Ergotrate was given by mouth. Consultation with a bacteriologist was held; the question of administering sulfanilamide was gone into, but the short duration of the clinical symptoms seemed to make this unnecessary. The patient has since had another baby, with a perfectly normal convalescence.

DEATHS

BRIGHAM — Fred C. Brigham, M.D., of Springfield, died January 22. He was in his seventieth year.

Born at Fayston, Vermont, he attended Green Mountain Seminary at Waterbury, Vermont, and the State Normal School at Randolph. He received his degree from Baltimore Medical College in 1898, and started practice in Salisbury and Jamaica, Vermont. Before going to Springfield he practiced in Westfield.

He was a member of the Massachusetts Medical Society, the American Medical Association, the Springfield Academy of Medicine, the Hampden County Medical Association, the Eastern Hampden Medical Society and the New England Society of Physical Medicine. Dr. Brigham retired from active practice in 1934.

His widow, two daughters and a sister survive him.

BURNHAM — J. Forrest Burnham, M.D., of Lawrence, died January 26. He was in his seventy-second year.

Dr. Burnham attended Harvard University and received his degree from the Harvard Medical School in 1901. He was a fellow of the Massachusetts Medical Society and the American Medical Association. From 1914 to 1920 he was an alternate delegate and from 1920 to 1936 a delegate to the House of Delegates of the American Medical Association, and he had served as secretary of the Essex North District Medical Society. Dr. Burnham was secretary of the staff of the Lawrence General Hospital for many years and was a member of the Lawrence Medical Club.

His widow survives him.

PREBLE — William E. Preble, M.D., of Boston, died January 22. He was in his sixty-fifth year.

Born in Litchfield, Maine, he attended Bowdoin College and received his degree, cum laude, from Harvard Medical School in 1909. In 1925 he received an honorary degree from Bowdoin College.

Dr. Preble was a former instructor at Tufts College Medical School and had served as head of the medical department at the Boston Dispensary. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

His widow and a daughter survive him.

STIVERS — George L. Stivers, M.D., of Tucson, Arizona, died November 26, 1939. He was in his sixty-third year.

Dr. Stivers received his degree from the Long Island College of Medicine in 1899. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

His widow survives him.

MISCELLANY

MOTOR-VEHICLE DEATHS FOR 1939

Motor-vehicle deaths in one hundred and fifty-one major cities decreased 4 per cent in 1939 from the previous year; however a decrease of 10 per cent was reported for the first six months, according to reports made public recently by Director William L. Austin, Bureau of the Census, Department of Commerce. Deaths for 1939 totaled 8009, compared with 8376 for 1938, a decrease of 367. These percentage decreases are based on provisional figures for 1939 and 1938.

Considering only those deaths in each city due to motor-vehicle accidents occurring within the city limits, the 1939 reports showed a total of 5641 deaths. This figure is a decrease of 222 deaths, or 3.8 per cent, from the 5863 deaths reported for the same cities in 1938. The decrease in the total is reflected in the individual cities, eighty-one of which showed a decrease in the number of deaths from 1938, sixty-two showed increases, and eight cities had the same number.

Six of the cities having populations of 500,000 or more and showing decreases in the number of deaths occurring within the city are: New York City (2.8 per cent); Los Angeles (7.6 per cent); Cleveland (16.6 per cent); St. Louis (26.6 per cent); Boston (5.6 per cent); and Pittsburgh (8.5 per cent). Seven cities having similar populations and showing increases over the 1938 figures are: Chicago (0.5 per cent); Detroit (5.5 per cent); Baltimore (8.8 per cent); San Francisco (14.0 per cent); Milwaukee (26.8 per cent); Buffalo (1.2 per cent); and Washington (7.5 per cent).

CORRESPONDENCE

LICENSE REVOKED

To the Editor: The license of Dr. Simeon Weiner, 167 Pleasant Street, Worcester, was revoked by the Board of Registration in Medicine on January 18, because of participation in the production of premature termination of pregnancy.

Stephen Rushmore, M.D., *Secretary.*

State House,
Boston.

FEDERAL INSURANCE BENEFITS FOR SURVIVORS

To the Editor: No one is more familiar with the family problems caused by death than the doctor in whose care the family has entrusted its well-being. Beyond the sorrow and personal bereavement, the doctor is only too

painfully aware of the economic problems which the death of a breadwinner may bring to a family. Yet, in many cases, he is powerless to assist when more than his own medical services are needed.

The new provisions of Federal Old-Age and Survivors Insurance, effective January 1, 1940, may have an abiding interest for doctors as a means of eliminating, or at least reducing substantially, the economic misfortunes occasioned, in many cases, by death. A brief summary of those provisions which might be of special interest to the general family practitioner follows.

New survivors' benefits are payable on the death of an insured wage earner after December 31, 1939. In contrast with the old-age payments after the age of sixty-five, survivors benefits are payable without regard to the age of the deceased. In all cases, the person on whose wages the benefits are based must have been a wage earner in business or industry after 1936, and must meet the eligibility requirements. Detailed information of these requirements may be obtained from any of the forty-four field offices of the Social Security Board, located in the principal cities of New England.

The kinds of survivors' benefits are as follows:

(1) Monthly cash benefits for insured wage earner's widow, after the age of sixty-five, until she remarries or dies.

(2) Monthly cash benefits for insured wage earner's widow, regardless of age, while she has in her care the deceased's unmarried dependent children under the age of sixteen or under the age of eighteen if still attending school.

(3) Monthly cash benefits for insured wage earner's unmarried dependent child or children under the age of sixteen, or under the age of eighteen if still attending school.

(4) Monthly cash benefits for insured wage earner's dependent parents, after the age of sixty-five, if no widow, or child under the age of eighteen, survives.

(5) Lump sum if insured wage earner leaves no survivors immediately entitled to monthly benefits.

The following table gives examples of survivors' monthly benefits according to wage, years of coverage and number of dependents:

Average Monthly Wage of Deceased Worker	One Child, or Parent 65 or Over	Widow 65 or Over	Widow and One Child
WITH 3 YEARS OF COVERAGE			
$50	$10.30	$15.45	$25.75
100	12.87	19.31	32.18
150	15.45	23.17	38.62
250	20.60	30.90	51.50
WITH 5 YEARS OF COVERAGE			
$50	$10.50	$15.75	$26.25
100	13.12	19.69	32.81
150	15.75	23.62	39.37
250	21.00	31.50	52.50
WITH 10 YEARS OF COVERAGE			
$50	$11.00	$16.50	$27.50
100	13.75	20.60	34.37
150	16.50	24.75	41.25
250	22.00	33.00	55.00

Complete information on this subject may be obtained by directing the inquiry to the Social Security Board Field Office at the nearest of the following locations:

Connecticut — Bridgeport, Hartford, Meriden, New Britain, New Haven, New London, Stamford, Torrington, Waterbury and Willimantic.

Maine — Augusta, Bangor, Lewiston and Portland.

Massachusetts — Attleboro, Boston (120 Boylston Street or 40 Central Street), Brockton, Cambridge, Chelsea, Dorchester, Fall River, Fitchburg, Haverhill, Holyoke, Lawrence, Lowell, Lynn, Malden, New Bedford, Pittsfield, Quincy, Salem, Springfield, Waltham and Worcester.

New Hampshire — Concord, Littleton, Manchester, Nashua and Portsmouth.

Rhode Island — Newport, Pawtucket, Providence and Woonsocket.

Vermont — Burlington, Montpelier and Rutland.

JOHN PEARSON, *New England Regional Director,*
Social Security Board.

TESTS FOR SYPHILIS DURING PREGNANCY

To the Editor: A considerable number of physicians have inquired of this department as to how they should proceed, under the law requiring serological tests for syphilis in pregnancy, when the patient refuses to permit a specimen of blood to be taken.

Obviously, no physician can compel a patient to permit the specimen to be taken or take it forcibly without being liable to suit for assault. On the other hand, the law directs the physician to take the specimen but does not compel the patient to permit it to be taken. We have advised those physicians who have inquired, as follows:

(1) If the physician desires to continue to care for the patient, he may request that she give him a statement in writing to the effect that she refuses to have the specimen taken and accepts personal responsibility for any accident to her pregnancy or the infection of her infant with syphilis which may result from failure to have the blood test done.

(2) If the physician would rather not assume any responsibility in the matter, he may inform the patient that she had better seek medical care elsewhere. It might be well to confirm that advice to the patient in writing.

Unless the physician protects himself through some such means as this, it is conceivable that he might be sued for failure to take the test if the patient produces a syphilitic child or has an accident to her pregnancy on the basis of her infection with syphilis.

N. A. NELSON, M.D., *Director,*
Division of Genitoinfectious Diseases,
Massachusetts Department of Public Health.

State House,
Boston.

TYPHOID VACCINE

To the Editor: Typhoid vaccine (monovalent), instead of typhoid-paratyphoid B vaccine, will be distributed routinely by the Department of Public Health after March 1, 1940. This is in accordance with the action of the Public Health Council, which action was prompted by the low incidence of paratyphoid B fever. The monovalent typhoid vaccine should cause fewer reactions than the bivalent and should fulfill the chief purpose of immunization against enteric fevers.

For a time, at least, the typhoid-paratyphoid B vaccine will be available on special request, but will not be sent otherwise.

PAUL J. JAKMAUH, M.D.,
Commissioner of Public Health.

State House,
Boston.

UNITED STATES PHARMACOPOEIAL CONVENTION

To the Editor: The public scientific conferences will be held simultaneously at the Willard Hotel, Washington, District of Columbia, during the afternoon and evening of Monday, May 13, the day preceding the opening of the 1940 Pharmacopoeial Convention. The programs are being developed under the direction of the General Chairman of the Committee of Revision aided by the chairmen of subcommittees and advisory boards and will be presided over by the subcommittee and advisory board chairmen.

All who are interested in perfecting the pharmacopoeial monographs are invited to take part in these advance conferences. The greatly increased importance of the scope and the standards of the *Pharmacopoeia* to medicine and surgery, to pharmacy in all its divisions, and to the enforcement officials of the federal and state governments calls for the widest collaboration from those who are interested in pharmacopoeial standards.

Those who can participate in this program should write to the specific subcommittee or board chairman responsible for the subjects in which they are interested. The chairmen are listed in the *Pharmacopoeia*. If preferred, the subject to be presented may be sent directly to the General Chairman of the Committee of Revision, and the chairman of the particular conference covering the subject will be immediately notified.

E. Fullerton Cook, *General Chairman, U. S. P. XI,* Committee of Revision.

43rd Street and Woodland Avenue,
Philadelphia.

NOTICES

BOSTON DOCTORS' SYMPHONY ORCHESTRA

The Boston Doctors' Symphony Orchestra will rehearse under Alexander Theide, former concertmaster with the Cleveland Symphony Orchestra and the Philadelphia Symphony Orchestra, every Thursday at 8:30 p.m., in Studio A, Station WMEX, 70 Brookline Avenue, Boston. Those interested in becoming members should communicate with Dr. Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430).

SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, February 20, at 12 o'clock noon. Dr. Edward A. Edwards will speak on "The Common Diseases of the Veins."

Physicians are cordially invited to attend.

TUMOR CLINIC, BOSTON DISPENSARY

Each Tuesday and Friday morning, 10:00 to 12:30, there is a meeting of the Tumor Clinic of the Boston Dispensary, a unit of the New England Medical Center. Neoplasms of various sorts are seen and discussed, and when there is an indication, are treated with radium of high-voltage x-ray. Physicians are invited to visit this clinic. They may bring patients for aid in diagnosis or may refer patients to the clinic following which a report will be returned to the referring physician. A limited number of beds are available for diagnostic study and for treatment.

BOSTON LYING-IN HOSPITAL

The Journal Club will hold a meeting at the Boston Lying-in Hospital on Tuesday evening, February 13, at 8:15. Dr. W. E. Caldwell will speak, his subject being "The Obstetric Pelvis."

JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

The following talks will be given in the auditorium of the Joseph H. Pratt Diagnostic Hospital during the week of February 4:

Monday, February 5, at 4:30 p.m. Cancer of the Stomach. Dr. George Pack, of the Memorial Hospital, New York City.
Discussion by Dr. Howard M. Clute.

Thursday, February 8, at 4:30 p.m. Tumors of the Bone. Dr. Bradley Coley, of the Memorial Hospital, New York City.
Discussion by Dr. Channing C. Simmons.

Reticulum-cell Sarcoma of Bone. Dr. Channing C. Simmons.

Physicians are cordially invited to attend these lectures.

JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

Bennet Street, Boston
Lecture Hall, 9–10 a.m.

Medical Conferences

Friday, February 2 — The Diagnosis of Multiple Myeloma. Dr. B. M. Jacobson.
Saturday, February 3 — Hospital case presentation. Dr. Thannhauser.
Tuesday, February 6 — Skin Cancer. Dr. F. M. Thurmon.
Wednesday, February 7 — Hospital case presentation. Dr. Thannhauser.
Thursday, February 8 — Gynecological Cancer. Dr. L. E. Phaneuf.
Friday, February 9 — Hodgkin's Disease. Drs. William Dameshek and Isadore Olef.
Saturday, February 10 — Intrathoracic Cancer. Drs. R. H. Overholt and R. H. Betts.
Tuesday, February 13 — Hospital case presentation. Dr. Thannhauser.
Wednesday, February 14 — Clinicopathological conference. Dr. C. S. Keefer.
Thursday, February 15 — Title to be announced. Dr. A. A. Thibodeau.
Friday, February 16 — Some Observations on Pituitary Adenomas. Dr. M. C. Sosman.
Saturday, February 17 — Hospital case presentation. Dr. Thannhauser.
Tuesday, February 20 — Paralysis Agitans. Dr. H. I. Harris.
Wednesday, February 21 — Hospital case presentation. Dr. Thannhauser.
Friday, February 23 — Epidemiology of Respiratory Infections. Dr. Dwight O'Hara.
Saturday, February 24 — Hospital case presentation. Dr. Thannhauser.
Tuesday, February 27 — Suppurative Disease of the Lungs. Dr. L. F. Davenport.
Wednesday, February 28 — Hospital case presentation. Dr. Thannhauser.

Thursday, February 29 — The Medical, Social and Preventive Aspects of a Selected Case. Preceptors and medical students.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, February 7, from 2 to 4 p.m. Drs. Robert Zollinger and William P. Murphy will speak on "Menorrhagia." A clinicopathological conference conducted by Dr. Elliott C. Cutler will take place from 4 to 5 p.m.

On Thursday, February 8, from 8:30 to 9:30 a.m. there will be at the Peter Bent Brigham Hospital, a combined clinic, conducted by Dr. Charles A. Janeway, of the medical, surgical, orthopedic, and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital.

Physicians and students are cordially invited to attend.

WILLIAM HARVEY SOCIETY

A meeting of the William Harvey Society of Tufts College Medical School will be held in the auditorium of the Beth Israel Hospital, Boston, on Friday evening, February 9, at 8:00. Dr. Albert N. Richards will speak on "Kidney Function." The meeting will be conducted by Dr. David Rapport.

Interested members of the medical profession and their friends are invited to attend.

GREATER BOSTON MEDICAL SOCIETY

A meeting of the Greater Boston Medical Society will be held in the auditorium of the Beth Israel Hospital on Tuesday evening, February 6, at 8:15. Clinical papers will be presented by members of the staff of the New England Medical Center.

PROGRAM

Group Psychotherapy. Dr. Herbert I. Harris.
Carcinoma of the Rectum. Dr. William M. Shedden.
Hyperlipemia. Dr. S. J. Thannhauser.
Anorexia Nervosa or Hypopituitarism? Dr. Samuel Proger.
"What We Can and Cannot Do in Allergy." Dr. Ethan A. Brown.

NEW ENGLAND DERMATOLOGICAL SOCIETY

The next meeting of the New England Dermatological Society will be held on Wednesday, February 14, at 2:00 p.m. at the Massachusetts General Hospital. There will be a dinner following the meeting.

UNITED STATES MARINE HOSPITAL

The staff meeting of the United States Marine Hospital, Chelsea, will be held at "The Hut," on Wednesday afternoon, February 7, at 4:00 p.m. Dr. Henry D. Chadwick will talk, his subject being "Epidemiology of Tuberculosis."

UNIVERSITY EXTENSION COURSES

To help prepare young people for work as medical secretaries and to assist dental hygienists in learning up-to-the-minute information on health education, the Massachusetts Department of Education has scheduled two university-extension courses, namely "Training for Doctors' Secretaries" and "Public-Health Education for Dental Hygienists."

The secretarial course, consisting of eight lectures, will be given by Dr. Robert M. Green, associate professor of applied anatomy at Harvard Medical School. In these lectures Dr. Green will consider the following basic medical sciences: anatomy, hygiene, physiology, pathology, pharmacology, dietetics and nutrition. The class will meet on Tuesdays, at 7:30 p.m., starting February 6, in Sever Hall, Harvard University, Cambridge.

The course on health education will consist of fifteen lectures and will be given by Miss Jean V. Latimer, coordinator of health education, Division of Child Hygiene, Massachusetts Department of Public Health, and instructor in health education, Hyannis State Teachers College (summer session), and by Dr. Florence B. Hopkins, dental pediatrician, Massachusetts Department of Public Health. The course will be held at the Forsyth Dental Infirmary for Children, 140 Fenway, Boston, beginning Friday, February 9, at 7:15 p.m.

Registration may be made at the first meeting of each class, or, to insure enrollment, at the office of the Division of University Extension, State Education Building, 200 Newbury Street, Boston.

AMERICAN ASSOCIATION FOR THE STUDY OF GOITER

The next annual meeting of the American Association for the Study of Goiter will be held at Rochester, Minnesota, April 15, 16 and 17. The program for the three-day meeting will consist of papers dealing with goiter and other diseases of the thyroid gland, dry clinics conducted by guests of the association, and operative clinics conducted by the staff of the Mayo Clinic.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY, FEBRUARY 4

SUNDAY, FEBRUARY 4

4 p.m. Facts and Fancies About Heart Disease. Dr. Paul D. White. Free public lecture. Harvard Medical School, amphitheater of Building D.

4 p.m. Heart Disease. Dr. Burton E. Hamilton. Illustrated, public, health lecture. Faulkner Hospital auditorium.

MONDAY, FEBRUARY 5

*12:15–1:15 p.m. Clinicopathological conference. Dr. S. Burt Wolbach, Peter Bent Brigham Hospital amphitheater.

*4 p.m. Physicians and medical students are cordially invited to attend a clinic presented by the medical, surgical and orthopedic services of the Infants' and Children's hospitals in the amphitheater of the Children's Hospital.

*4:30 p.m. Cancer of the Stomach. Dr. George Pack. Joseph H. Pratt Diagnostic Hospital.

TUESDAY, FEBRUARY 6

*9–10 a.m. Skin Cancer. Dr. Francis M. Thurmon. Joseph H. Pratt Diagnostic Hospital.

*10 a.m.–12:30 p.m. Boston Dispensary tumor clinic.

*12:15–1:15 p.m. X-ray conference. Dr. Merrill C. Sosman. Peter Bent Brigham Hospital amphitheater.

8:15 p.m. Greater Boston Medical Society. Beth Israel Hospital auditorium.

WEDNESDAY, FEBRUARY 7

New England Pediatric Society. Children's Hospital amphitheater and Longwood Towers.

*9–10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*12 m. Clinicopathological conference. Children's Hospital amphitheater.

*2–4 p.m. Joint medical and surgical clinic. Peter Bent Brigham Hospital.

THURSDAY, FEBRUARY 8

*8:30–9:30 a.m. Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital, at the Peter Bent Brigham Hospital.

*9–10 a.m. Gynecological Cancer. Dr. Louis E. Phaneuf. Joseph H. Pratt Diagnostic Hospital.

*4:30 p.m. Tumors of the Bone. Dr. Bradley Coley. Joseph H. Pratt Diagnostic Hospital.

FRIDAY, FEBRUARY 9

*9–10 a.m. Hodgkin's Disease. Drs. William Dameshek and Isadore Olef. Joseph H. Pratt Diagnostic Hospital.

*10 a.m.–12:30 p.m. Boston Dispensary tumor clinic.

*8 p.m. William Harvey Society. Beth Israel Hospital auditorium.

SATURDAY, FEBRUARY 10

*9–10 a.m. Intrathoracic Cancer. Drs. Richard H. Overholt and Reeve H. Betts. Joseph H. Pratt Diagnostic Hospital.

*10 a.m.–12 m. Medical staff rounds of the Peter Bent Brigham Hospital. Conducted by Dr. C. Sidney Burwell.

*Open to the medical profession.

FEBRUARY 2 — Staff meeting. United States Marine Hospital. Page 165, issue of January 25.

FEBRUARY 2–29 — Joseph H. Pratt Diagnostic Hospital, medical conferences. Page 202.

FEBRUARY 4 — Free public lecture. Harvard Medical School. Page 1042, issue of December 28.

FEBRUARY 4 — Public lecture. Salem Hospital. Page 1042, issue of December 28.

FEBRUARY 4 — Free public lecture. Quincy City Hospital. Page 77, issue of January 11.

FEBRUARY 4 — Illustrated, public, health lectures. Faulkner Hospital. Page 164, issue of January 25.

FEBRUARY 5 — Cancer of the Stomach. Dr. George Pack. Joseph H. Pratt Diagnostic Hospital. Page 202.

FEBRUARY 6 — Greater Boston Medical Society. Page 203.

FEBRUARY 7 — New England Pediatric Society. Page 164, issue of January 25.

FEBRUARY 7 — Wachusett Medical Improvement Society. Page 164, issue of January 25.

FEBRUARY 7 — Staff meeting. United States Marine Hospital. Page 203.

FEBRUARY 7 — Joint medical and surgical clinic. Peter Bent Brigham Hospital. Page 203.

FEBRUARY 8 — Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital. Page 203.

FEBRUARY 8 — Tumors of the Bone. Dr. Bradley Coley. Joseph H. Pratt Diagnostic Hospital. Page 202.

FEBRUARY 8 — Pentucket Association of Physicians. 8:30 p.m., Hotel Bartlett, Haverhill.

FEBRUARY 9 — William Harvey Society. Page 203.

FEBRUARY 11–14 — International College of Surgeons. Page 759, issue of November 9.

FEBRUARY 13 — Boston Lying-in Hospital, Journal Club. Page 202.

FEBRUARY 14 — New England Dermatological Society. Page 203.

FEBRUARY 20 — South End Medical Club. Page 202.

FEBRUARY 22–24 — American Orthopsychiatric Association. Page 957, issue of December 14.

MARCH 2, JUNE 8 and 10 — American Board of Ophthalmology. Page 719, issue of November 2.

MARCH 7–9 — The New England Hospital Association. Hotel Statler, Boston.

APRIL 15–17 — American Association for the Study of Goiter. Page 203.

APRIL 24–26 — Scientific Session. Academy of Physical Medicine. Hotel John Marshall, Richmond, Virginia.

MAY 10–18 — American Scientific Congress. Page 1043, issue of December 28.

MAY 13 — United States Pharmacopoeial Convention. Page 202.

JUNE 7–9 — American Board of Obstetrics and Gynecology. Page 1019, issue of June 15.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

FEBRUARY 14 — Cough, Sputum, Hemoptysis — How shall they be investigated? Dr. Reeve H. Betts. Essex Sanatorium, Middleton.

MARCH 6 — Experimental and Clinical Considerations of Sulfanilamide Treatment of Hemolytic Streptococcus Infections. Dr. Champ Lyons. Lynn Hospital, Lynn.

APRIL 3 — Addison Gilbert Hospital, Gloucester.

MAY 8 — Annual meeting. Salem Country Club, Peabody.

HAMPSHIRE

MARCH 13.

MAY 8.

Meetings are held at 11:30 a.m. at the Cooley Dickinson Hospital, Northampton.

MIDDLESEX EAST

MARCH 20.

MAY 15.

Meetings are held at 12:15 p.m. at the Unicorn Country Club, Stoneham.

MIDDLESEX NORTH

APRIL 24.

JULY 31.

OCTOBER 30.

NORFOLK SOUTH

MARCH 7.

APRIL 4.

MAY 2.

All meetings, with the exception of one which is usually held at the Quincy City Hospital, are held at the Norfolk County Hospital in South Braintree, at 12 o'clock noon.

PLYMOUTH

MARCH 21 — Goddard Hospital, Brockton.

APRIL 18 — State Farm.

MAY 16 — Lakeville Sanatorium, Lakeville.

SUFFOLK

MARCH 27 — Scientific meeting. Symposium on Ulcerative Colitis and Diarrheas. Under the direction of Dr. Chester M. Jones.

APRIL 24 — Annual meeting in conjunction with the Boston Medical Library. Election of officers. Program and speakers to be announced later.

WORCESTER

FEBRUARY 14 — Worcester State Hospital.

MARCH 13 — Worcester Memorial Hospital.

APRIL 10 — Worcester Hahnemann Hospital.

MAY 8 — Worcester Country Club.

Each meeting begins with a dinner at 6:30 p.m. and is followed by a business and scientific meeting.

BOOKS RECEIVED FOR REVIEW

Manual of Public Health Nursing. Prepared by the National Organization for Public Health Nursing. Third edition. 529 pp. New York: The Macmillan Co., 1939. $2.50.

A True History of the Terrible Epidemic Vulgarly Called the Throat Distemper which Occurred in His Majesty's New England Colonies between the Years 1735 and 1740. Ernest Caulfield. 113 pp. New Haven: *Yale Journal of Biology and Medicine,* 1939. $2.50.

Hereditary and Environmental Factors in the Causation of Manic-Depressive Psychoses and Dementia Praecox. Horatio M. Pollock, Benjamin Malzberg and Raymond G. Fuller. 473 pp. New York: State Hospitals Press, 1939. $2.50.

Hygiène et cancer. P. Delore. 52 pp. Paris: Presses Universitaires de France, 1939. 6 Fr. fr.

Recent Advances in Medical Science: A study of their social and economic implications. Edward Mellanby. 62 pp. New York: The Macmillan Co., 1939. 75 cents.

Les perforations digestives de la fièvre typhoïde: pronostic, diagnostic et traitement. Jacques Dor. 134 pp. Paris: Masson et Cie, 1939. 24 Fr. fr.

Treatment and What Happened Afterward: A study from the Judge Baker Guidance Center. William Healy and Augusta F. Bronner. 54 pp. Boston: Judge Baker Guidance Center, 1939. 50 cents.

Beyond the Clinical Frontiers: A psychiatrist views crowd behavior. Edward A. Strecker. 210 pp. New York: W. W. Norton & Co., 1940. $2.00.

A Doctor Without a Country. Thomas A. Lambie. 252 pp. New York: Fleming H. Revell Co., 1939. $2.00.

The Patient's Dilemma: The quest for medical security in America. Hugh Cabot. 284 pp. New York: Reynal and Hitchcock, 1940. $2.50.

Virus and Rickettsial Diseases: With especial consideration of their public health significance. A symposium held at the Harvard School of Public Health June 12-June 17, 1939. 907 pp. Cambridge, Massachusetts: Harvard University Press, 1940. $6.50.

Les hermaphrodites et la chirurgie. L. Ombrédanne. 322 pp. Paris: Masson et Cie, 1939. 85 Fr. fr.